Rel. 4.

S

OCT 02 2001

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 629413

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Design Engineering	n/a
5. Proj./Prog./Dept./Div.:	**6. Design Authority/Design Agent/Cog. Engr.:**	**7. Purchase Order No.:**
River Protection Project	G. P. Janicek	n/a
		9. Equip./Component No.: Various
		10. System/Bldg./Facility: Tank Farms
		12. Major Assm. Dwg. No.: n/a
		13. Permit/Permit Application No.: n/a
		14. Required Response Date: n/a

8. Originator Remarks:

This is the initial issuance of this document. It contains the rationale for the safety classification of all components of Tank Farm Safety Systems, as identified in the Tank Farm Safety Analysis Report. Rev. 0 contains the SEL for safety systems evaluated herein

11. Receiver Remarks: 11A. Design Baseline Document? ☒ Yes ☐ No

This document does not yet address all Tank Farm Safety Systems. Until it does so, via later revisions, it must be used in conjunction with HNF-SD-WM-SEL-040. This document is covered by USQ# TF-01-0729.

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	RPP-8792		0	Sub-System and Component Level Safety Classification Evaluation & Identification for Tank Farm Safety Systems	S			

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D OR N/A (See WHC-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority GP Janicek	GP Janicek	10/02/01	57-12
		Design Agent			
		Cog. Eng.			
1	1	Cog. Mgr. Des Eng. AH Friberg	AH Friberg R3-83	10/2/01	
		QA			
1	1	Safety NS&L. GW Gault	GW Gault	10/2/01	
		Env.			

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Des Auth. RD Gustavson	R.D. Gustavson	10/2/01	
1	1	Des Auth. RW Reed	RW Reed	2 Oct 2001	
1	1	Des Auth. CC Scaief	C.C. Scaief	10-2-01	
1	1	Rev Chair. RE Merriman	RE Merriman	10/2/01	
1	1	Rev Comm. EL Dalpiaz	E.L. Dalpiaz	10/2/01	
1	1	Rev Comm. EW Girgis	Elie W. Girgis	10/2/01	

18. GP Janicek — Signature of EDT Originator — Date 10/01/01

19. Authorized Representative for Receiving Organization — Date

20. AH Friberg — Design Authority/ Cognizant Manager — Date 10/2/01

21. DOE APPROVAL (if required)

Ctrl No. _____

☐ Approved
☐ Approved w/comments
☐ Disapproved w/comments

BD-7400-172-2 (10/97)

BD-7400-172-1

SUB-SYSTEM AND COMPONENT LEVEL SAFETY CLASSIFICATION EVALUATION & IDENTIFICATION FOR TANK FARM SAFETY SYSTEMS

G. P. Janicek
CH2MHill Hanford Group, INC.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-99RL14047

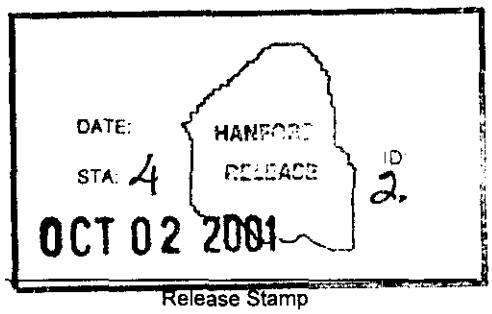
EDT/ECN: EDT-629413 UC:
Cost Center: 7G100 Charge Code: 106662
B&R Code: Total Pages: 89

Key Words:
Tank Farms, Safety Equipment List, Component Safety Classification, Safety System Components

Abstract: This document provides the safety classification, and classification rationale, for all elements of (some) Tank Farm Safety Systems identified in the Tank Farms Final Safety Analyses. It also contains the official Safety Equipment List (SEL) for the safety systems evaluated. The initial issue of this document does not address all Tank Farm safety systems. The remainder will be addressed, and incorporated in this document, in subsequent revisions.

*Eberline is a registered trademark of Eberline Instrument Corporation.

10-02-01
Release Approval Date



Release Stamp

Approved For Public Release

SUB-SYSTEM AND COMPONENT LEVEL SAFETY CLASSIFICATION EVALUATION & IDENTIFICATION FOR TANK FARM SAFETY SYSTEMS

Prepared By

G. P. Janicek

CH2MHill Hanford Group

October, 1, 2001

Table of Contents

(this page left blank)

SUB-SYSTEM AND COMPONENT LEVEL SAFETY CLASSIFICATION EVALUATION & IDENTIFICATION FOR TANK FARM SAFETY SYSTEMS

1.0 PURPOSE

The primary purpose of this document is to capture the rationale used in determining the safety classification of Tank Farm systems, structures, and components (SSCs) below the level of their parent Safety SSC as identified in the Tank Farms Final Safety Analysis Report (FSAR) [reference 1]. The intended working purpose is for all necessary and sufficient information be incorporated herein to 1st, justify the safety classifications assigned, 2nd, enable understanding of the safety functions thus defined for any subsequent design or equipment changes, and 3rd, as an aid in determining the level of qualification control required for operation, maintenance, and field replacement.

2.0 SCOPE

The SSCs addressed in this document are elements of the safety systems identified in the FSAR, and will be used to populate the Tank Farm Safety Equipment List (SEL). Currently, this represents almost all of the safety SSCs within the Tank Farms boundaries, primarily those that are of a permanent or semi-permanent nature, but not all. Some of those SSCs, governed by the Tank Farms Authorization Basis (AB), mostly temporary or mobile equipment and/or project related SSCs, have separate SELs and are not addressed herein. Neither will all safety SSCs, currently addressed in the AB, be addressed in the Rev. 0 issue of this document. Those not addressed initially will be addressed in subsequent revisions. It should be particularly noted that all elements of a given safety system will be addressed, and classified, in this document, including those that are deemed general-service.

3.0 APPROACH

OWNERSHIP

Ownership of the 'Design Bases' for all Tank Farm facilities resides with the CHG Design Engineering organization. The Manager of Design Engineering assigns a Design Authority (DA) to one or more facility systems for purposes of approving and maintaining its respective design basis. Some DAs are also assigned responsibility for defining and maintaining the SEL for certain safety systems, which includes providing the content of this document pertaining to the safety classification of elements of that safety system. The assigned DA for any given Tank Farm facility system can be obtained by referring to the DA Responsibility Matrix accessible on the Internet at Tank Farm Contractor/Technical Resources/Engineering/Points of Contact/Design Authorities. The DA responsible for the content of the SEL for a particular safety system is indicated in the section of the SEL database for that safety system.

DESK INSTRUCTION

The methodology for determining the safety classification of sub-systems and components below the FSAR defined 'System Level' is contained in a Desk Instruction (DI) issued by Design Engineering. The DI [reference 2], aptly entitled "Desk Instruction and Method for Determining Safety Classification" is accessible on the intranet under the Tank Farm Contractor Procedures home page.

FAILURE MODES AND EFFECTS ANALYSES (FMEAs)

The DI cited above for determining safety classification utilizes SSC exclusion categories which are generic and applicable to various Tank Farm systems. These SSC exclusion categories have a safety classification of general-service (GS). For each exclusion category, an FMEA has been prepared, justifying its GS designation. All FMEAs are contained in the Appendix to this document.

EVALUATIONS

The main body of this document, Section 4.0, is a compilation of the safety system evaluations performed by the respective DA owner of that particular safety system. Each evaluation first identifies the parent safety system and safety function as defined in the FSAR. Then, the components of the system are identified, evaluated with regard to their parent system safety function, and then classified as either safety-class (SC), safety significant (SS), or general–service (GS). A safety system may first be broken down into sub-systems, if applicable.

CONFIGURATION CONTROL

The content of this document will be maintained under configuration control. All entries will be reviewed and approved according to document change control procedure, including, by the DAs within Design Engineering, as a minimum. Also, this document is intended to be the gateway for controlling the content of the SEL database, the official reference source* for Tank Farm SSC safety classification. Therefore, all input and changes to the SEL database will be accomplished through change control to this document, at least initially. Initially, the SEL database, in spreadsheet form, will be appended to this document. Eventually, it will be made a stand-alone electronic database.

* Note: The Tank Farms SEL is currently contained in SEL-040 [reference 3]. The Rev. 0 issuance of this document will re-define the safety SSCs for those safety systems addressed and be used to populate the new SEL database. Those safety systems not yet addressed herein will continue to use SEL-040 in the interim. Eventually this document, and the new SEL database will completely replace SEL-040, which will then be cancelled.

DOCUMENT ORGANIZATION

The order in which safety systems are presented in the initial issuance of this document, and subsequently broken down into sub-system/component safety classifications, is meant to parallel the order of presentation found in Chapter 4.0 of the FSAR. The order in the FSAR may change over time due to additions, deletions, or changes in safety classification therein. For purposes of convenience, this document may, or may not, elect to maintain this parallelism as the FSAR changes.

4.0 SAFETY CLASSIFICATION EVALUATIONS

4.1 DOUBLE-SHELL AND AGING WASTE FACILITY TANK VENTILATION SYSTEMS

SAFETY CLASSIFICATION: SAFETY CLASS
ACCIDENT: 3.4.2.2. FLAMMABLE GAS DEFLAGRATION
SAFETY FUNCTIONS: "THE SAFETY FUNCTIONS OF THE DST AND AWF TANK PRIMARY TANK VENTILATION SYSTEMS ARE TO PREVENT THE ACCUMULATION OF FLAMMABLE GASES DUE TO STEADY-STATE RELEASES, THUS DECREASING THE FREQUENCY OF THE FLAMMABLE GAS DEFLAGRATION ACCIDENT."

The safety function of the Double-Shell Tank (DST) and Aging Waste Facility (AWF) primary tank ventilation systems maintains flammable gas concentrations in tank dome spaces that are caused by steady state releases below 25% of the Lower Flammability Limit (LFL). The functional requirement for the DST/AWF Ventilation Systems is to maintain a vapor space vacuum between 0.06 to 1.49 kPa (0.25 to 6.0 inches water gauge [WG]) in each of the tanks.

Primary tank ventilation systems remove flammable gases from the vapor spaces in all tanks in DST farms 241-AN, -AP, -AW, and -SY, and all tanks in AWF tank farms 241-AY and -AZ. The systems draw outside air into the tanks where it mixes with and displaces flammable gases produced by the waste. The air-gas mixture is then removed from the tanks, filtered to remove radioactive particulates, and exhausted to the environment.

These active ventilation systems are vulnerable to drive train malfunctions, loss of electrical power, and control system trips when process monitors malfunction.

The Double-Shell and Aging Waste Facility (AWF) primary tank ventilation systems typically consist of:

- Filtered tank inlet air stations (all DSTs except those in 241-AP tank farm).
- Tank inlet and outlet ductwork.
- Inlet and outlet butterfly valves for tank air flow and vacuum adjustment.
- Isolation valves.
- Demisters or De-Entrainers
- In-duct air stream heater.
- Exhaust pre-filters.
- Exhaust High Efficiency Particulate Air (HEPA) filters.
- Filter housings.
- Condensate collection system.

- Exhaust fan assembly.
- Exhaust stack.
- Stack emission sampling and monitoring system.
- Static pressure, temperature, flow sensors, instrumentation, and related operational control.
- Assorted alarm and interlock systems.

Additionally, the AWF primary tank ventilation system (aka 702-AZ) includes:

- High-Efficiency Mist Eliminator (HEME).
- Condenser.
- Re-circulation Loop.
- High-Efficiency Gas Adsorber (HEGA).

SAFETY-CLASS COMPONENTS

Exhaust Fan Units

Exhaust fan units provide the motive force for developing and maintaining airflow through the primary tank vapor space. They directly and actively contribute to the safety function of the system. Therefore, these components are classified as safety class. In some cases, certain subcomponents or parts may be long-lead or special order replacement items should they fail.

Subcomponents, or parts, of the exhaust fan unit that define fan performance are also classified as Safety Class. These include:

1. Exhaust Fan Motors
2. Motor Electrical Contacters
3. Exhaust Fan Impellers (Wheels)
4. Exhaust Fan Housings
5. Exhaust Fan Variable Speed Drive (VSD) Units
6. Exhaust Fan Sheaves

Common fan parts designed to be sacrificial are considered to be consumable; that is, designed to eventually fatigue and fail. These and other common fan parts that play no role in the safety related function are classified as General Service, as discussed below in "General Service Components."

Tank Inlet Motor Operated Dampers

Motor operated dampers on the tank air inlets for each of the tanks in 241-AY and –AZ tank farms are classified as safety class. These valves provide a flow path for fresh air into each tank, and they do not have parallel redundancy or bypass capability. Mechanical or electrical failure of the damper actuator, or any other failure of the damper in the closed position would preclude fresh air flow into the tank, leading to a loss of ventilation and buildup of flammable gases in the tank vapor space. Although it is reasonable that this type of failure would be readily detected

with tank pressurization (loss of vacuum) alarms or other means, repair or replacement may not be accomplished before accident pre-conditions are approached (e.g., unacceptable flammable gas build-up within the tank).

SAFETY-SIGNIFICANT COMPONENTS

Exhaust HEPA Filters

Exhaust HEPA filters are safety-significant components on DST/AWF primary tank ventilation systems that have HEPA Filter Differential Pressure (dP) Interlock systems installed to meet Limiting Condition of Operation (LCO) 3.1.8 of the Tank Safety Requirements (TSR). Although the HEPA filters are components of the DST/AWF primary tank ventilation systems, their safety function and classification are discussed in Section 4.7, HIGH-EFFICIENCY PARTICULATE AIR FILTER UNITS.

Stack Continuous Air Monitor Interlock Subsystem

The stack continuous air monitor (CAM) system is a subsystem of the DST/AWF primary tank ventilation systems. Specific components of this system and its exhaust fan interlock function are classified as safety-significant components. Because this subsystem provides a mitigative safety function for a different analyzed accident than addressed in this section, its safety function and system/component safety classifications are discussed in Section 4.12, VENTILATION STACK CONTINUOUS AIR MONITOR SYSTEMS.

HEPA Filter Differential Pressure Interlock System

The HEPA Filter dP Interlock system is a subsystem of the DST/AWF primary tank ventilation systems. Specific components of this system and its exhaust fan interlock function are classified as safety-significant components. Because this subsystem provides a preventive and mitigative safety functions for a different analyzed accident than addressed in this section, its safety function and system/component safety classifications are discussed in Section 4.14, HIGH-EFFICIENCY PARTICULATE AIR FILTER DIFFERENTIAL PRESSURE INTERLOCK SYSTEMS.

GENERAL SERVICE COMPONENTS

Common Exhaust Fan Parts

Common exhaust fan parts or sub-components such as the fan shaft, shaft bearings, belts and lubricants are designed to be sacrificial and are therefore considered consumable (i.e., designed to eventually fatigue and fail). It should be noted that even though these "parts" are consumable, no single consumable part failure would result in complete fan inoperability for extended periods. This is due to the fact that these consumable parts are common to all commercial industries and a national infrastructure exists that in most cases, allows for "next day"

availability and in worse case, no greater than 30 days. Also, failure or degradation of the any of these parts provides enough audible warning (e.g., abnormal noise) or system monitored parameter warning (e.g., tank pressure) to allow for a controlled shutdown and/or shift to a redundant exhaust fan without entering into an undetected accident precondition. Therefore, the following fan parts or sub-components are classified as General Service:

- Fan Shafts
- Fan Shaft Bearings
- Fan Drive Belts
- Lubricants
- Lubrication Fittings
- Consumable Component Monitoring Devices (e.g., vibration monitoring, belt monitoring etc.)
- Shaft Seals

Other common fan parts such as motor mounting plates, fan shaft guards and drive belt guards are considered "industrial safety or convenience" accessories and play no role in the safety related function of the component. Therefore, the following fan parts are considered General Service:

- Belt Guards
- Shaft Guards
- Motor Mounting Plates
- Bearing and Motor Mounting Fasteners
- The Bearing Support Pedestal

Filtered Tank Inlet Air Stations

HEPA filtered inlet air stations exist on the primary tank ventilation systems for 241-SY, -AY, -AZ, -AN, and –AW tank farms. They do not exist on the 241-AP primary tank ventilation system, which relies on infiltration pathways for its intake air. Depending on location, inlet air stations may include: inlet prefilters; inlet filters; filter housings; constant air flow devices (flow controllers); differential pressure indicating instrumentation and/or loop components for inlet prefilters, filters, and flow controller filters; tank air inlet heaters; air inlet temperature indicating instrumentation and/or loop components; inlet butterfly valves; and bypass inlet butterfly valves. Single failure of any of these components will not affect the safety function.

Ventilation System Ductwork, Expansion Joints, and Stacks

All ventilation system ductwork, including expansion joints, flexible boots, stacks, and HEPA filter housings are designated as general service. Although ductwork provides a contained path for primary exhaust flow from the tank, is not always redundant, and structural damage or loss (i.e., due to crushing or rupture) may preclude airflow from one or more tanks, there are no credible intrinsic system or hardware failure modes. These are passive components. Compliance to strict design codes and standards is mandated by Washington State law for these confinement components to ensure the likelihood of structural damage or loss is minimized.

Demisters/De-Entrainers

Ventilation system demisters or moisture de-entrainers are classified as general service components. These units are passive devices that capture and remove entrained moisture droplets from the air stream. Partial or full failure of demister screen media can result in wetted exhaust HEPA filters, ultimately resulting in a reduction in performance or failure of those filters. However, HEPA filter failure or reduced filtration performance will not adversely affect the systems ability to prevent accumulation of flammable gases. Typically, the units are configured in the system to allow them to be bypassed, thereby allowing airflow through the ventilation system to continue uninterrupted. Plugging of demisters, where bypass capability is not available, may affect the system safety function by blocking airflow, but the condition is only credibly reached through gradual build-up of material over a long period of time. Surveillance monitoring and trending of demister differential pressure ensures that allowable operating ranges are not exceeded and that preventive or corrective maintenance activities are initiated.

Exhaust High-Efficiency Mist Eliminator (HEME)

The 702-AZ (241-AY and –AZ tank farm) primary tank ventilation system includes a HEME for confinement of radiological and hazardous materials and confinement of the majority of tank liquids to the "hotter" side of the system to reduce moisture, salts, and radiological load on the exhaust HEPA filters. This unit is classified as general service, as its failure affects efficiency but not the safety function of the ventilation system. Associated differential pressure monitoring and alarm instrument loop components help to optimize performance of the equipment, but they are not necessary for performance of the system safety function. The HEME may be bypassed allowing airflow through the ventilation system to continue uninterrupted.

HEME Radiation Monitor

This device indicates the radioactive inventory within the HEME unit. It is used to indicate the need for HEME change out. It is used to implement a portion of safety management program Administrative Control AC 5.18, HEPA Filter Controls. It does not impact the safety function of the primary tank ventilation system, and therefore it is classified as general service.

702-AZ Primary Condenser

The 702-AZ (241-AY and –AZ tank farm) primary tank ventilation system includes a condenser for confinement of radiological and hazardous materials and confinement of the majority of tank liquids to the "hotter" side of the system to reduce moisture, salts, and radiological load on the exhaust HEPA filters. This unit is classified as general service, as its failure affects efficiency but not the safety function of the ventilation system. Associated differential pressure and temperature indicating, monitoring and alarm instrument loop components help to optimize performance of the equipment, but they are not necessary for performance of the system safety function. The condenser may be bypassed, allowing airflow through the ventilation system to continue uninterrupted.

Exhaust High-Efficiency Gas Adsorber (HEGA) Charcoal Filters

The 702-AZ (241-AY and –AZ tank farm) primary tank ventilation system includes HEGA (Charcoal) filters for confinement of radiological and hazardous materials. The HEGA filters are classified as general service components. Failure (breach) of the filters does not prevent flow or interfere with the ventilation system safety function. Substantial plugging is not a credible event. In the event of failure or plugging, a redundant parallel filter train is available.

702-AZ Recirculation Loops

The 702-AZ (241-AY and –AZ tank farm) primary tank ventilation system include recirculation loops that recirculate a portion of the exhaust flow back through the tanks to provide a waste/vent cooling function. The recirculation loops include: fans; moisture separators; moisture condensers; temperature indication instrument loop components; differential pressure monitoring and alarm instrument loop components; and other miscellaneous components. The recirculation loops can be isolated and bypassed without affecting the safety function of the primary tank ventilation system. All components within the recirculation loop subsystems are classified as general service.

Exhaust Air Stream Heater Subsystems

Air stream heaters are installed to protect exhaust HEPA filters from condensation by sufficiently raising and maintaining the air temperature above the dewpoint, thereby reducing the relative humidity to below 70%. Although failure of these heating systems could affect HEPA filter life, there is no credible failure mode that would affect the ventilation system safety function. Therefore, these subsystems and related components are classified as general service. These subsystems may include the following components: heater (electric or glycol), temperature sensing elements, sensing element sheaths, differential temperature controllers and switches, high temperature heater interlock subsystem, and fan/heater interlock subsystem.

Ventilation System Isolation, Bypass, and Flow Control Valves and Dampers

All valves and dampers that provide isolation or bypass of exhaust train components are classifed as general service. Depending on location, these valves are used to isolate and/or bypass:

- Parallel exhausters (SY farm only)
- Parallel demister trains (AN, AP, AW farms only)
- Parallel filter trains
- Parallel exhaust fans
- HEME (702-AZ only)
- Primary condenser (702-AZ only)
- Flow control dampers (702-AZ only)
- Recirculation loops (702-AZ only)

In all cases, should a valve fail open or closed, redundant flow paths and/or redundant isolation valves allow for configuration changes to preclude prolonged failure of the ventilation system

safety function. It is reasonable to expect that a failed valve would be detected through tank pressurization alarms or other system alarms.

Tank Outlet Butterfly Valves

Primary tank ventilation outlet butterfly valves for each of the tanks in 241-AN, -AP, -AW, and –SY tank farms are classified as general service. These manually-operated valves serve a passive function during operation. There is no credible operating system driven failure that would result in these valves failing in the closed position, thereby defeating the ventilation system safety function.

Tank Outlet Motor Operated Flow Control Dampers (702-AZ only)

These dampers are used to regulate flow from each AWF tank and balance the system automatically. They may be isolated in bypass by manual dampers. Damper failure does not eliminate flow or the ability to control primary flow or system balance, as the damper may be isolated and bypassed, and flow can be adjusted using the manual bypass damper and flow indicating instruments. Damper failure does not affect the system safety function, therefore these components are classified as general service.

Damper Limit Switches (702-AZ only)

Damper limit switches are installed on all motor-operated and manual dampers on the primary tank ventilation system for 241-AY and –AZ tank farms to remotely indicate damper positions. These components are classified as general service. A loss of signal verifying positions of the dampers routing primary flow would not affect the safety function, as there are alternate means of verifying valve lineup.

Exhaust Train Prefilters

Prefilters on the exhaust filter train are installed to remove large particles from the air stream to prevent clogging of the HEPA filter. These components are classified as general service. There are no credible failure modes that could affect the safety function of the ventilation system. Differential pressure monitoring and alarming instrumentation loops for prefilters are also classified as general service.

Condensate Collection Subsystem

Condensate collection subsystems are installed on primary tank ventilation systems to collect air stream condensate from demisters/de-entrainers, HEMEs, condensers, filter housings, and stacks, and to return the condensate to one or more DSTs. All components of these subsystems are classified as general service, as they do not affect the safety function of the respective primary tank ventilation system that they support. These subsystems may include: piping; valves; seal pots; indicators and/or alarms; and in some cases, secondary encasement with leak detection equipment.

Exhaust HEPA Filter Differential Pressure Monitoring and Alarm Devices

Individual HEPA filter and filter train differential pressure monitoring and alarm equipment, with the exception of those components described in Section 4.14, HIGH-EFFICIENCY PARTICULATE AIR FILTER DIFFERENTIAL PRESSURE INTERLOCK SYSTEMS, are classified as general service, as they do not affect the safety function of the primary tank ventilation system.

Flow Measurement Devices

All flow indication loop components or devices are classified as general service. These flow indication devices provide parameter monitoring, but they do not directly support the safety function. They are used to optimize flows in various parts of the system, verify system operability (241-AY & AZ only), or measure stack emission flow rates.

Stack Emission Record Sampler Subsystem

Stack emission record sample systems are installed to collect a representative sample from the emission stack air stream for subsequent analysis and reporting of radioactive emissions. These environmental subsystems and all inclusive components are classified as general service, as their operation has no impact on the ventilation system safety function.

4.2 PRIMARY TANK LEAK DETECTION SYSTEMS

SAFETY CLASSIFICATION: SAFETY CLASS
ACCIDENT: 3.4.2.2. FLAMMABLE GAS DEFLAGRATION
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE PRIMARY TANK LEAK DETECTION SYSTEMS IS TO PROVIDE AN ALARM OF TANK WASTE FROM MISROUTES OR OTHER SYSTEM LEAKS INTO THE TANK ANNULUS TO ALERT OPERATORS TO TAKE ACTION TO PREVENT A FLAMMABLE GAS DEFLAGRATION IN THE DST OR AWF TANK ANNULUS, THUS DECREASING THE FREQUENCY OF THE FLAMMABLE GAS DEFLAGRATION ACCIDENT."

4.2.1 Primary Tank Leak Detection - CAM

The CAM Primary Tank Leak Detection System consists of the Continuous Air Monitor (CAM), associated sampling system components and the alarms. The CAM, flow regulator, vacuum pump and the alarms are designated as SC. In addition, the heat trace and cabinet fan, heater and thermostatic controls are designated as SC since they maintain environmental conditions to ensure the system operates continuously.

SAFETY-CLASS COMPONENTS

CAM
The CAM provides detection and alarm actuation when radiation levels are above the set point. As such it is the primary initiator of the alarm and is therefore SC.

Flow Regulator

The Eberline sample flow regulator is designed to maintain a constant pressure drop across an in-line orifice by controlling a variable bypass valve into the pump. The orifice is adjustable, permitting flow rate adjustment from near zero up to the maximum pump flow velocity. This flow control system permits the pump to operate at a minimum pressure drop at all times which provides cooler pump operation to extend the lifetime. As with most regulator systems, the RAP-1R is not ideal. As the sample flow decreases (as measured by increased vacuum at the sample inlet) the adjustment of the regulator (via a diaphragm linked to the bypass valve) to reestablish the sample flow rate, leaves the flow slightly lower than the original value. The bypass valve has a spring return to the closed position (fail-close). It appears that this would result in an increase in sample flow should the regulating diaphragm or the linkage fail. This mode would be considered fail-safe. All failure modes of the regulator, however, are presently not analyzed. Until or unless there is additional analysis, it is assumed that there is a credible failure mode that would result in significant loss of flow.

Vacuum Pump

The vacuum pump provides the motive force for the sample collection and directly and actively contributes to the safety function of the system.

Alarms

The high radiation alarm at the CAM and the high radiation annunciator alarms in the instrument building are SC. The white beacon and/or red strobe indicators where applicable are SC.

Heat Trace

The sample line from the stack or duct to the CAM cabinet is insulated and heat traced. Under some environmental conditions moisture could condense in the sample line if the heat trace were inoperable. This moisture could result in degradation of the overall CAM system efficiency. The heat trace is a continuous, self-regulating tape that is constructed with two parallel current carrying conductors with resistive elements distributed between them along its length. The tape is primarily passive, however, it does provide a wattage that varies with temperature. Heat tracing for the return lines is also SC if the line does not drain to the duct (sufficient slope) or if low point traps exist.

Cabinet Temperature Control Subsystem

The cabinet fans, heaters and associated thermostatic controls ensure that the environment within the cabinet does not exceed the operating limits of the equipment and degrade performance of the CAM system.

GENERAL SERVICE COMPONENTS

Sample Probe

The sample probe is classified as GS since it performs a passive function and has no credible inherent failure modes. Any replacement probe must meet the dimensional and any material requirements and should be fabricated or procured with associated verification of the design requirements.

Particulate Filter
The particulate filter ensures that particles are collected and exposed to the radiation detector in the CAM. The filters are passive and therefore are classified as GS. They are, however, important to achieving the overall safety function. The manufacturer and model of filter used is specified by the Site-Wide Effluent Monitoring (EM) Program and approved by the facility Environmental Compliance Officer (ECO as specified in HNF-IP-0842, Volume VI, Section 5.1, paragraph 4.11. Presently this is a Gelman Sciences Versapor 3000 that is a membrane filter designed for 3 micron particles in liquid or 0.3 micron particles in air.

Flow Switch
The flow switch (if applicable) provides an indication of loss of minimum flow, however, its failure would not result in the loss of the safety function. The switch is calibrated and tested on a regular periodic schedule.

Alarm Relays and Wiring
The alarm circuitry is activated by normally energized control relays. The wiring is passive. The control relays are fail-safe for credible failure modes. As such the alarm circuitry is classified GS. This includes the local status panel within the cabinet where applicable.

Other Alarms
As mentioned above, local (at the CAM enclosure) alarms on the status panel that include fail, flow, temperature, as well as high beta/gamma are not considered SC. All remote alarms for other than high radiation are also GS.

4.2.2 Primary Tank Leak Detection - Level/Conductivity

The Level/Conductivity Primary Tank Leak Detection Systems consist of liquid level sensors near the floor of the annulus of the DST/AWF tanks. All tanks except SY Farm employ conductivity sensors. SY Farm utilizes Enraf buoyancy type level devices for detection of leaks into the annulus. The SC components for the conductivity systems consist of the sensing relay and the alarms.

SAFETY-CLASS COMPONENTS

Sensing Relay
The conductivity systems employ a relay that is activated by sensing a small current that flows through a conductive path created by shorting the probe or sensor to ground. Although in some cases the relay may be fail-safe on loss of power, there are other failure modes that could result in loss of safety function.

Alarms
The local annunciator alarm in the instrument building provides the operator the indication that a leak may be present and is classified as SC.

GENERAL SERVICE COMPONENTS

Probe
The fixed probes employed in AY and AZ Farms as well as the Flake boxes used in the East Area DSTs are classified as GS. Both devices are passive. The Flake box that is a tape reel level sensor can be adjusted for probe height, however, in actual use it is passive.

Alarm Relays and Wiring
The alarm circuitry is activated either directly by the sensing relay or indirectly via an interposing normally energized control relay. The wiring is passive. The normally energized control relays, when applicable, are fail-safe for credible failure modes. As such the alarm circuitry is classified GS.

Zone Indicators
Some of the systems have zone lights to indicate which of the three sensors employed in each tank is in alarm. These lights are used for trouble shooting and/or leak location should one occur. As such they are classified as GS.

4.2.3 Double-Shell Tank and Aging Waste Facility Annulus Ventilation

The DST and AWF annulus ventilation systems directly support the operation of the CAM Primary Tank Leak Detection System described in Section 4.2.1 by providing air movement from the annulus space to the tank leak detector CAMs. The system is the primary motive force for transporting radiological contaminants from the tank annulus space to the CAM sample withdrawal probes in the event of a waste misroute or leak to the annulus space. Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.

Because of the important safety functional relationship with the leak detector CAMs, the annulus ventilation systems are designated as Safety Class. These active ventilation systems are vulnerable to drive train malfunctions, loss of electrical power, and control system trips when process monitors malfunction.

The Double-Shell and Aging Waste Facility (AWF) annulus ventilation systems typically[1] consist of:

- Filtered annulus inlet air stations.
- Annulus inlet and outlet ductwork.
- Inlet and outlet butterfly valves for annulus air flow and vacuum adjustment.
- Isolation valves.
- Inlet heaters.
- Demisters.
- In-duct exhaust air stream heater.
- Exhaust pre-filters.
- Exhaust High Efficiency Particulate Air (HEPA) filters.
- Filter housings.

[1] Note that all the systems are not identical, and one particular annulus ventilation system may not include all of the listed subcomponents.

- Condensate collection system.
- Exhaust fan assembly.
- Exhaust stack.
- Stack emission sampling and monitoring system.
- Static pressure, temperature, flow sensors, instrumentation, and related operation control.
- Assorted alarm and interlock systems.

SAFETY-CLASS COMPONENTS

Exhaust Fan Units

Exhaust fan units provide the motive force for developing and maintaining airflow through the annulus space. They directly and actively contribute to the safety function of the system. Therefore, these components are designated as safety class. In some cases, certain subcomponents or parts may be long lead or special order replacement items should they fail.

Subcomponents, or parts, of the exhaust fan unit that define fan performance are also designated as Safety Class. These include:

7. Exhaust Fan Motors
8. Motor Electrical Contactors
9. Exhaust Fan Impellers (Wheels)
10. Exhaust Fan Housings
11. Exhaust Fan Sheaves

Common fan parts designed to be sacrificial are considered to be consumable; that is, designed to eventually fatigue and fail. These and other common fan parts that play no direct role in the safety related function are designated as general service, as discussed below in "General Service Components."

GENERAL SERVICE COMPONENTS

Common Exhaust Fan Parts

Common exhaust fan parts or sub-components such as the fan shaft, shaft bearings, belts and lubricants are designed to be sacrificial and are therefore considered consumable (i.e., designed to eventually fatigue and fail). It should be noted that even though these "parts" are consumable, no single consumable part failure would result in complete fan inoperability for extended periods. This is due to the fact that these consumable parts are common to all commercial industries and a national infrastructure exists that in most cases, allows for "next day" availability and in worse case, no greater than 30 days. Also, failure or degradation of the any of these parts provides enough audible warning (e.g., abnormal noise) or system monitored parameter warning (e.g., pressure indicators & alarms) to allow for a controlled shutdown and/or shift to a redundant exhaust fan without entering into an undetected accident precondition. Therefore, the following fan parts or sub-components are designated as general service:

- Fan Shafts
- Fan Shaft Bearings
- Fan Drive Belts
- Lubricants
- Lubrication Fittings
- Consumable Component Monitoring Devices (e.g., vibration monitoring, belt monitoring etc.)
- Shaft Seals

Other common fan parts such as motor mounting plates, fan shaft guards and drive belt guards are considered "industrial safety or convenience" accessories and play no direct role in the safety related function of the component. Therefore, the following fan parts are designated general service:

- Belt Guards
- Shaft Guards
- Motor Mounting Plates
- Bearing and Motor Mounting Fasteners
- The Bearing Support Pedestal

Filtered Tank Inlet Air Stations

Fresh air is drawn into the annulus ventilation systems through filtered inlet air stations. Depending on location, inlet air stations may include: inlet prefilters; inlet HEPA filters; filter housings; differential pressure indicating instrumentation and/or loop components for inlet prefilters, filters; tank air inlet heaters; and air inlet temperature indicating instrumentation and/or loop components. Failure of any of these components will not affect the safety function.

Annulus Inlet Station Dampers

DST and AWF annulus inlet station dampers are designated general service. On the 241-AP, 241-AW, and 241-AY annulus ventilation systems, these multi-blade sheet metal dampers are single, in-line, manually operated units in the inlet ducting of each inlet station, and they do not have parallel redundancy or bypass capability. Failure of the damper in the closed position would limit powered flow through the annulus of the tank, thereby limiting the ventilation system safety function for that particular tank annulus. However, failure of an inlet damper would be readily noticed through alarms and/or surveillance, and the dampers are easily accessible for quick removal, if necessary, and eventual replacement. The operation of the ventilation system is not dependent on whether these dampers are in place. The 241-AZ system has redundant parallel flow paths to allow flow to continue should an inlet valve or damper fail. The 241-SY and 241-AN systems do not have these components.

Inlet Station-To-Annulus Isolation Butterfly Valves

Inlet station-to-annulus isolation butterfly valves are designated general service. These manually-operated valves serve a passive function during operation. They are used to isolate the inlet filter from the tank annulus to allow filter change out. There is no credible operating system driven failure that would result in these valves failing in the closed position, thereby defeating the ventilation system safety function.

Annulus Outlet Butterfly Valves

Annulus outlet butterfly valves on annulus ventilation systems in 241-AN, -AP, –AW, -SY, -AY, and -AZ tank farms are designated general service. These manually-operated valves serve a passive function during operation. They are used to isolate the exhauster from the tank annuli to allow filter change out. There is no credible operating system driven failure that would result in these valves failing in the closed position, thereby defeating the ventilation system safety function.

Filter Train-to-Fan Isolation Valves (241-AZ only)

Isolation butterfly valves downstream of each of the two filter trains in the 241-AZ annulus ventilation system are designated as general service. These manually-operated valves serve a passive function during operation. They are used to isolate an exhaust train (and associated tank annulus) from the downstream exhaust fan that is common to each of the two filter trains (and tank annuli). There is no credible operating system driven failure that would result in these valves failing in the closed position, thereby defeating the ventilation system safety function.

Ventilation System Ductwork, Expansion Joints, Plenums, and Stacks

All ventilation system ductwork, including plenums, expansion joints, flexible boots, stacks, and HEPA filter housings are designated as general service. Although ductwork provides a contained path for exhaust flow from the annulus, is not always redundant, and structural damage or loss (i.e., due to crushing or rupture) may preclude airflow from one or more annuli, there are no credible intrinsic system or hardware failure modes. These are passive components. Compliance to strict design codes and standards is mandated by Washington State law for these confinement components to ensure the likelihood of structural damage or loss is minimized.

Demisters

Ventilation system demisters or moisture de-entrainers are designated as general service components. These units are passive devices that capture and remove entrained moisture droplets from the air stream. Partial or full failure of demister screen media can result in wetted exhaust HEPA filters, ultimately resulting in a reduction in performance or failure of those filters. However, HEPA filter failure or reduced filtration performance will not adversely affect the system ability to move air through the annulus. Typically, the units are configured in the system to allow them to be bypassed, either as a subsystem or as part of a parallel exhaust train, thereby allowing airflow through the ventilation system to continue uninterrupted. Plugging of demisters, where bypass capability is not available, may affect the system safety function by blocking airflow, but the condition is only credibly reached through gradual build-up of material

over a long period of time. Surveillance monitoring and trending of demister differential pressure ensures that allowable operating ranges are not exceeded and that preventive or corrective maintenance activities are initiated.

Exhaust Air Stream Heater Subsystems

Air stream heaters are installed to protect exhaust HEPA filters from condensation by sufficiently raising and maintaining the air temperature above the dew point, thereby reducing the relative humidity to below 70%. Although failure of these heating systems could affect HEPA filter life, there is no credible failure mode that would affect the ventilation system safety function. Therefore, these subsystems and related components are classified as general service. These subsystems may include the following components: heater (electric or glycol), temperature sensing elements, sensing element sheaths, differential temperature controllers and switches, high temperature heater interlock subsystem, and fan/heater interlock subsystem.

Ventilation System Isolation, Bypass, and Flow Control Dampers

With the exception of those designated as safety class above, all other annulus ventilation system valves and dampers that provide isolation or bypass of exhaust train components are classified as general service. Depending on location, these valves are used to isolate and/or bypass:

- Parallel demister trains
- Parallel filter trains
- Parallel exhaust fans
- Flow control dampers

In all cases, should a valve fail open or closed, redundant flow paths and/or redundant isolation valves allow for configuration changes to preclude prolonged failure of the ventilation system safety function. It is reasonable to expect that a failed valve would be detected through system pressure indicators and alarms.

Exhaust Train Prefilters

Prefilters on the exhaust filter train are installed to remove large particles from the air stream to prevent clogging of the HEPA filter. These components are designated general service. There are no credible failure modes that could affect the safety function of the ventilation system.

Exhaust Train HEPA Filters

Exhaust train HEPA filters are installed to filter particulate from the air stream prior to exhaust to the atmosphere. These components are designated as general service. There are no credible failure modes that could affect the safety function of the ventilation system.

Differential Pressure Monitoring and Alarm Devices

Differential pressure monitoring and alarming instrumentation loops for demisters, exhaust prefilters, HEPA filters, filter trains, and exhaust fans are designated general service.

Differential pressure switches for alarms and interlocks are also general service. These components are intended to protect other components of the ventilation system, and failure of these items will not affect the system safety function.

Condensate Collection Subsystem

Condensate collection subsystems are installed on annulus ventilation systems to collect air stream condensate from demisters, filter housings, and stacks, and to route the condensate to one or more DSTs. All components of these subsystems are designated as general service, as they do not affect the safety function of the respective annulus ventilation system that they support. These subsystems may include: piping; valves; seal pots; indicators; and/or alarms.

Flow Measurement Devices

Flow indication loop components or devices are designated general service. Flow indication devices are used to optimize flows in various parts of the system or are used to measure stack emission flow rates.

Annulus Pressure Measurement Devices

Annulus pressure indicators and pressure switches are designated general service. Pressure indicators provide indication of the pressure in the annulus. Pressure switches sense the vacuum in the tank annulus and send a signal to a motor operated damper upstream of the fan and/or to alarms and interlocks. These devices are not necessary for the system to meet its safety function, and failure of these components will not affect the system safety function.

Stack Emission Sampling & Monitoring Subsystem

Stack CAM and emission record sample systems are installed, respectively, to monitor the emission for high radiation and to collect a representative sample from the emission stack air stream for subsequent analysis and reporting of radioactive emissions. These environmental subsystems and all included components are classified as general service, as their operation has no impact on the ventilation system safety function.

4.3 SINGLE-SHELL TANK VENTILATION SYSTEMS

SAFETY CLASSIFICATION: SAFETY-CLASS
ACCIDENT: 3.4.2.2 FLAMMABLE GAS DEFLAGRATIONS
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE SST ACTIVE AND PASSIVE VENTILATION SYSTEMS IS TO PREVENT THE ACCUMULATION OF FLAMMABLE GASES DUE TO STEADY-STATE RELEASES, THUS DECREASING THE FREQUENCY OF THE FLAMMABLE GAS DEFLAGRATION ACCIDENT."

TBD

4.4 244-AR TK-002 VAULT VENTILATION SYSTEM

SAFETY CLASSIFICATION: SAFETY-CLASS
ACCIDENT: 3.4.2.2 FLAMMABLE GAS DEFLAGRATIONS
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE 244-AR TK-002 VENTILATION SYSTEM IS TO PREVENT THE ACCUMULATION OF FLAMMABLE GASES DUE TO STEADY-STATE RELEASES, THUS DECREASING THE FREQUENCY OF THE FLAMMABLE GAS DEFLAGRATION ACCIDENT."

TBD

4.5 OVERGROUND TRANSFER SYSTEM

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.7 WASTE TRANSFER LEAKS
SAFETY FUNCTIONS: THE SAFETY FUNCTION OF THE OGT SYSTEM ENCASEMENT AND CONNECTIONS IS TO DIRECT THE FLOW OF LEAKED WASTE FROM THE PRIMARY LINE TO A WASTE TRANSFER-ASSOCIATED STRUCTURE FOR DETECTION, THUS DECREASING THE CONSEQUENCES OF THE WASTE TRANSFER LEAK ACCIDENTS."

"THE SAFETY FUNCTION OF THE OGT SYSTEM VEHICLE IMPACT BARRIERS IS TO PROTECT THE INTEGRITY OF THE PRIMARY AND ENCASEMENT LINES FROM VEHICLE IMPACTS, THUS DECREASING THE FREQUENCY OF THE WASTE TRANSFER LEAKS ACCIDENT. ALTERNATIVELY, THIS SAFETY FUNCTION MAY BE PROVIDED BY ADMINISTRATIVE VEHICLE ACCESS LIMITATIONS."

TBD

4.6 BACKFLOW PREVENTION SYSTEMS

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.7 WASTE TRANSFER LEAK
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE BACKFLOW PREVENTION SYSTEMS LOCATED IN THE 204-AR WASTE UNLOADING FACILITY (WASTE UNLOADING ROOM) AND FOR THE SALT WELL PUMP IN-LINE DILUTION SYSTEMS IS TO PREVENT A BACKFLOW OF WASTE INTO TANK FARM RAW WATER SYSTEMS AS WELL AS RAW WATER SYSTEMS LEADING TO THE 204-AR WASTE UNLOADING FACILITY (MECHANICAL EQUIPMENT ROOM) WHERE A LEAK COULD OCCUR. THIS DECREASES THE FREQUENCY OF THE WASTE TRANSFER LEAK ACCIDENT."

TBD

4.7 HIGH-EFFICIENCY PARTICULATE AIR FILTER UNITS

4.7.1 HEPA Filter Failure – Exposure to High Temperature or Pressure

SAFETY CLASSIFICATION: SAFETY SIGNIFICANT

ACCIDENT: 3.3.2.4.2. HIGH-EFFICIENCY PARTICULATE AIR FILTER FAILURE – EXPOSURE TO HIGH TEMPERATURE OR PRESSURE
SAFETY FUNCTION: "THE SAFETY FUNCTION OF THE VENTILATION SYSTEM HEPA FILTERS IS TO PROVIDE HEPA FILTRATION OF HEADSPACE GASES BEFORE THEIR RELEASE TO THE ENVIRONMENT, THUS REDUCING THE LIKELIHOOD OF UNFILTERED RELEASES DUE TO PARTIAL HEPA FILTER RELEASE EVENTS ASSOCIATED WITH THE HEPA FILTER FAILURE – EXPOSURE TO HIGH TEMPERATURE OR PRESSURE ACCIDENT."

The exhaust HEPA Filters on DSTs, AWF tanks, the 244-CR vault, and actively ventilated SSTs are identified as safety-significant for the accident analyzed in Section 3.3.2.4.2 of the FSAR. Where the HEPA Filter Differential Pressure Interlock, as described in the Technical Safety Requirements (TSR) bases, is in place (installed), the accident analysis identified the HEPA filters as Safety-Significant components, as operable HEPA filters reduce the likelihood of unfiltered release events associated with partial HEPA filter failures. This is because of the potential for small leakage due to partial failure or bypass of the HEPA filters that would not be detectable by the HEPA filter differential interlock system.

The only components described in this section are the HEPA filters. Classification of filter housings is discussed in Section 4.1, DOUBLE-SHELL AND AGING WASTE FACILITY TANK VENTILATION SYSTEMS.

SAFETY-SIGNIFICANT COMPONENTS

All exhaust train HEPA filters are classified as Safety-Significant on the following ventilation systems as a result of HEPA Filter Differential Pressure Interlock system installation:

- 241-AP Primary Tank Ventilation System (four filters total in two parallel trains)
- 241-AN Primary Tank Ventilation System (four filters total in two parallel trains)
- 241-AW Primary Tank Ventilation System (four filters total in two parallel trains)
- 241-SY K1-A (SY "A" Train) Primary Tank Ventilation System (two filters in-series)
- 241-SY K1-4-1 (SY "B" Train) Primary Tank Ventilation System (two filters in-series)
- 241-AY/AZ (702-AZ) Primary Tank Ventilation System (four filters total in two parallel trains)
- 244-CR Vault Ventilation System (eight filters total in two in-series banks)

GENERAL SERVICE COMPONENTS

There are no General Service components for this system, because the system consists of the filters only.

4.7.2 Mixing of Incompatible Material – Double Contained Receiver Tank Pressurization

SAFETY CLASSIFICATION: SAFETY SIGNIFICANT
ACCIDENT: 3.3.2.4.12. MIXING OF INCOMPATIBLE MATERIAL – TANK PRESSURIZATION

SAFETY FUNCTION: "THE SAFETY FUNCTION OF THE DCRT VENTILATION SYSTEM HEPA FILTER UNIT (ONE STAGE) IS TO PROVIDE HEPA FILTRATION OF DCRT HEADSPACE GASES BEFORE THEIR RELEASE TO THE ENVIRONMENT, THUS DECREASING THE CONSEQUENCES OF THE MIXING OF INCOMPATIBLE MATERIAL – TANK PRESSURIZATION ACCIDENT."

TBD

4.8 PIPE ENCASEMENTS

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.7 WASTE TRANSFER LEAK
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE WASTE TRANSFER PIPE ENCASEMENT IS TO DIRECT THE FLOW OF LEAKED WASTE FROM THE PRIMARY LINE TO A WASTE TRANSFER-ASSOCIATED STRUCTURE FOR DETECTION, THUS DECREASING THE CONSEQUENCES OF THE WASTE TRANSFER LEAK ACCIDENT."

TBD

4.9 TANK LEVEL DETECTION SYSTEMS

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.4.2.11, TANK BUMP
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE TANK LEVEL DETECTION SYSTEMS IS TO SUPPORT THE IMPLEMENTATION OF THE LEVEL-DEPENDENT TANK TEMPERATURE CONTROLS, THUS DECREASING THE FREQUENCY OF THE TANK BUMP ACCIDENT."

4.9.1 DST Tank Waste Level Detection

The tank level detection system is used to support the temperature monitoring system. In order to implement Option (b) of LCO 3.3.2, it is necessary to know whether the tank waste level is greater than 15 feet. This is determined using the level detection system. In addition, the level system is not required to implement the LCO unless the temperature in the waste becomes greater than 195 degrees F. Continuous monitoring is not required. Some tanks have more than one type of level device, however, all DST/AWF tanks have an Enraf level gauge. As such, the only device selected as SS is the tank Enraf level gauge since it has the greatest accuracy.

SAFETY-SIGNIFICANT COMPONENTS

Enraf Waste Level Gauge
The Enraf level gauge operating with local readout is designated as SS. All other components associated with the gauge such as remote readouts and alarms are GS.

4.10 TEMPERATURE MONITORING SYSTEMS

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.4.2.6, ORGANIC SALT-NITRATE REACTION
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE TEMPERATURE MONITORING SYSTEMS IS TO PROVIDE TANK WASTE TEMPERATURE INFORMATION FOR OPERATOR MONITORING, ENABLING OPERATORS TO TAKE ACTIONS NECESSARY TO PREVENT EXCEEDING WASTE TEMPERATURES AT WHICH ORGANIC SALT-NITRATE REACTIONS COULD PROCEED, THUS DECREASING THE FREQUENCY OF THE ORGANIC SALT-NITRATE REACTION ACCIDENT. THE APPLICABILITY OF THIS FUNCTION IS DEFINED BY SL 2.1.1 (HNF-SD-WM-TSR-006)."

4.10.1 DST/AWF Temperature Monitoring

The Temperature Monitoring Systems consist of thermocouples (TC) in the tank waste, extension wire and local display devices. The temperatures are not required to be monitored continuously and can also be read using a portable electronic TC reader. The TCs are in some cases mounted in a "tree" made of carbon steel pipe and inserted into the waste via a tank riser. Some TCs are contained within metal sheaths while others are insulated TC wire routed inside the tree or pipe.

SAFETY-SIGNIFICANT COMPONENTS

Temperature Element
The TC element consists of TC wire and TC extension wire and is SS. Although the wire is passive, it is the actual sensor since it converts a temperature gradient to a voltage signal. The extension wire is included since TC wire develops a potential along any section that is exposed to a temperature difference.

Temperature Display Device
The display device converts the millivolt signal to a temperature value and adds it to the reference temperature. The types of displays consist of panel mounted instruments, local data loggers with displays, and portable electronic thermometers.

GENERAL SERVICE COMPONENTS

Temperature Tree
The pipe or temperature tree conduit is considered general service as it is a passive element. It provides a method for deploying the TC into the waste.

Tank Monitor and Control System (TMACS)
Although many of the TCs are connected to TMACS, the local and/or portable readers are used to satisfy the SS display requirement. TMACS provides monitoring and trending of temperatures as well as many other parameters.

Miscellaneous Equipment
Other passive components associated with the system include selector switches, connectors and enclosures.

4.11 TRANSFER LEAK DETECTION SYSTEMS

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.7 WASTE TRANSFER LEAK
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE TRANSFER LEAK DETECTION SYSTEM IS TO DETECT WASTE TRANSFER SYSTEM LEAKS IN WASTE TRANSFER-ASSOCIATED STRUCTURES AND TO PROVIDE AN ALARM TO ALERT OPERATORS TO TAKE MITIGATIVE ACTION TO SHUT DOWN THE TRANSFER PUMP (OR OTHER MOTIVE FORCE) AND TO TAKE RESPONSE ACTIONS TO LIMIT EXPOSURE TO ONSITE AND FACILITY WORKERS, THUS LIMITING THE VOLUME OF WASTE LEAKED AND THE TIME THAT WORKERS ARE EXPOSED TO THE LEAKED WASTE, THEREBY DECREASING THE CONSEQUENCES OF THE WASTE TRANSFER LEAK ACCIDENT. THE TRANSFER LEAK DETECTION SYSTEMS MAY ALSO BE CONNECTED TO THE MASTER PUMP SHUTDOWN SYSTEM, DESCRIBED IN SECTION 4.4.18, WHICH WILL AUTOMATICALLY SHUT DOWN THE TRANSFER PUMP."

TBD

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.4.2.2 FLAMMABLE GAS DEFLAGRATION
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE TRANSFER LEAK DETECTION SYSTEMS ARE TO DETECT WASTE LEAKS THAT MAY ACCUMULATE IN WASTE TRANSFER-ASSOCIATED STRUCTURES AND TO PROVIDE AN ALARM TO ALERT OPERATORS TO TAKE PREVENTATIVE ACTIONS, THUS DECREASING THE FREQUENCY OF THE FLAMMABLE GAS DEFLAGRATION ACCIDENT."

TBD

4.12 VENTILATION STACK CONTINUOUS AIR MONITOR (CAM) INTERLOCK SYSTEMS

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.2 HEPA FILTER FAILURE – EXPOSURE TO HIGH TEMPERATURE OR PRESSURE
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE VENTILATION STACK CAM INTERLOCK SYSTEMS IS TO SHUT DOWN THE VENTILATION SYSTEM WHEN HIGH RADIONUCLIDE PARTICULATE ACTIVITY IS DETECTED BY THE CAM, LIMITING RADIOACTIVE MATERIAL RELEASES TO THE ATMOSPHERE AND THUS DECREASING THE CONSEQUENCES OF THE HEPA FILTER FAILURE – EXPOSURE TO HIGH TEMPERATURE OR PRESSURE ACCIDENT."

4.12.1 Ventilation Stack CAM Interlock

The Ventilation Stack CAM Interlock SSC consists of the Continuous Air Monitor (CAM), associated sampling system components and the electrical interlock to the ventilation fans. The CAM, flow regulator, vacuum pump and the fan motor contactor are designated as SS. In addition, the heat trace and cabinet temperature controls are designated as SS since they maintain

environmental conditions to ensure the system operates continuously. For affected systems, components associated with automatic CAM sample flow control are also designated as SS.

SAFETY-SIGNIFICANT COMPONENTS

CAM
The CAM provides detection and interlock actuation when radiation levels are above the set point. As such it is the primary initiator of the interlock and is therefore SS.

Flow Regulator
The Eberline sample flow regulator is designed to maintain a constant pressure drop across an in-line orifice by controlling a variable bypass valve into the pump. The orifice is adjustable, permitting flow rate adjustment from near zero up to the maximum pump flow velocity. This flow control system permits the pump to operate at a minimum pressure drop at all times which provides cooler pump operation to extend the lifetime. As with most regulator systems, the RAP-1R is not ideal. As the sample flow decreases (as measured by increased vacuum at the sample inlet) the adjustment of the regulator (via a diaphragm linked to the bypass valve) to reestablish the sample flow rate, leaves the flow slightly lower than the original value. The bypass valve has a spring return to the closed position (fail-close). It appears that this would result in an increase in sample flow should the regulating diaphragm or the linkage fail. This mode would be considered fail-safe. All failure modes of the regulator, however, are presently not analyzed. Until or unless there is additional analysis, it is assumed that there is a credible failure mode that would result in significant loss of flow.

Vacuum Pump
The vacuum pump provides the motive force for the sample collection and directly and actively contributes to the safety function of the system.

Fan Motor Contactor
The fan motor contactor is fail-safe on loss of power, however, it is assumed that failure due to contact welding is credible since it is a current carrying (power) relay.

CAM Fail Alarm
Chapter 4 (4.4.8.3) of the FSAR states that actuation of an alarm upon CAM failure is a functional requirement. By definition, (FSAR, Rev G, Section 4.1, page 4-7) "functional requirements are those that are specifically needed to fulfill the identified safety functions". This alarm is not required to perform the safety function as defined. However, in order to remain consistent with the current version of the FSAR, the remote CAM fail alarm as well as the fail or "malfunction" alarm on the CAM are designated as SS. The local (in the cabinet) alarm panel indicator for "beta monitor fail" is not considered SS since the CAM provides that function.

Heat Trace
The sample line from the stack or duct to the CAM cabinet is insulated and heat traced. Under some environmental conditions moisture could condense in the sample line if the heat trace were inoperable. This moisture could result in degradation of the overall CAM system efficiency. The heat trace is a continuous, self-regulating tape that is constructed with two parallel current

carrying conductors with resistive elements distributed between them along its length. The tape is primarily passive, however, it does provide a wattage that varies with temperature. Heat tracing for the return lines is also SC if the line does not drain to the duct (sufficient slope) or if low point traps exist.

Cabinet Temperature Control Subsystem
The cabinet fans, heaters and associated thermostatic controls ensure that the environment within the cabinet does not exceed the operating limits of the equipment and degrade performance of the CAM system.

Isokinetic Flow Components
Some stack sampling systems (e. g. 702-AZ) have flow control that maintains the CAM sample flow in proportion to the stack flow to optimize sample collection efficiencies. Although maintaining isokinetic flow is not considered necessary to perform the safety function, since the control system could shut down flow under failure conditions, the components associated with the system are considered SS. These are the stack and CAM sample flow transmitters, their associated temperature transmitters, the flow controller, and the modulating flow control valve. A more detailed failure analysis may subsequently eliminate some components such as the temperature transmitters, however, pending any additional analysis these components are considered SS.

GENERAL SERVICE COMPONENTS

Sample Probe
The sample probe is classified as GS since it performs a passive function. Any replacement probe must meet the dimensional and any material requirements and should be fabricated or procured with associated verification of the design requirements.

Particulate Filter
The particulate filter ensures that particles are collected and exposed to the radiation detector in the CAM. The filters are passive and therefore are classified as GS. They are, however, important to achieving the overall safety function. The manufacturer and model of filter used is determined by the Site-Wide Effluent Monitoring (EM) Program and approved by the facility ECO as specified in HNF-IP-0842, Volume VI, Section 5.1, paragraph 4.11. Presently this is a Gelman Sciences Versapor 3000 that is a membrane filter designed for 3 micron particles in liquid or 0.3 micron particles in air.

Flow Switch
The flow switch provides an indication of loss of minimum flow, however, its failure would not result in the loss of the safety function. The switch is calibrated and tested on a regular periodic schedule.

Interlock Circuitry
The interlock circuitry consists of wiring and normally energized control relays. The wiring is passive. The control relays are fail-safe for credible failure modes. As such the interlock circuitry is classified GS.

Alarms
The alarms, although they provide system status, are not part of the safety function. As such, they are classified GS.

4.13 PRESSURE SWITCH INTERLOCK or ALARM SYSTEMS (SERVICE WATER LINES)

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.7 WASTE TRANSFER LEAK
SAFETY FUNCTIONS: "IF THE SYSTEM PRESSURE BOUNDARY INTEGRITY IS TESTED TO FULL TRANSFER SYSTEM PRESSURE, THE SAFETY FUNCTION IS TO DETECT BACKFLOW INTO THE PIPING SYSTEMS PHYSICALLY CONNECTED TO THE WASTE TRANSFER ROUTE, AND TO EITHER INTERLOCK, OR ALARM TO ALERT OPERATORS TO TAKE ACTION TO SHUT DOWN THE TRANSFER PUMP (OR OTHER MOTIVE FORCE), THUS PREVENTING A WASTE LEAK FROM THE TRANSFER SYSTEM, AND THEREBY DECREASING THE FREQUENCY OF A WASTE TRANSFER LEAK ACCIDENT. THE PRESSURE SWITCH INTERLOCK OR ALARM SYSTEMS MAY ALSO BE CONNECTED TO THE MASTER PUMP SHUTDOWN SYSTEM, DESCRIBED IN SECTION 4.4.12, WHICH WILL AUTOMATICALLY SHUT DOWN THE TRANSFER PUMP.

IF THE SYSTEM PRESSURE BOUNDARY INTEGRITY IS TESTED TO LESS THAN THE FULL TRANSFER SYSTEM PRESSURE, THEN LEAKAGE FROM THE SYSTEM CANNOT BE DISMISSED. IN THIS SITUATION THE SAFETY FUNCTION IS TO DETECT BACKFLOW INTO THE PIPING SYSTEMS PHYSICALLY CONNECTED TO THE WASTE TRANSFER ROUTE, AND TO EITHER INTERLOCK, OR ALARM TO ALERT OPERATORS TO TAKE ACTION TO SHUT DOWN THE TRANSFER PUMP (OR OTHER MOTIVE FORCE), AND ALARM TO ALERT OPERATORS TO TAKE RESPONSE ACTIONS TO LIMIT EXPOSURE TO ONSITE AND FACILITY WORKERS, THUS DECREASING THE CONSEQUENCES OF A WASTE TRANSFER LEAK ACCIDENT. THE PRESSURE SWITCH INTERLOCK OR ALARM SYSTEMS MAY ALSO BE CONNECTED TO THE MASTER PUMP SHUTDOWN SYSTEM, DESCRIBED IN SECTION 4.4.12, WHICH WILL AUTOMATICALLY SHUT DOWN THE TRANSFER PUMP."

TBD

4.14 HIGH-EFFICIENCY PARTICULATE AIR FILTER DIFFERENTAL PRESSURE INTERLOCK SYSTEMS

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.2 HEPA FILTER FAILURE – EXPOSURE TO HIGH TEMPERATURE OR PRESSURE
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE HEPA FILTER DIFFERENTIAL PRESSURE INTERLOCK SYSTEMS ARE (1) TO SHUT DOWN THE VENTILATION SYSTEM WHEN HIGH DIFFERENTIAL PRESSURE IS DETECTED BY THE DIFFERENTIAL PRESSURE SYSTEM, THEREBY PREVENTING THE RELEASE OF RADIOLOGICAL AND TOXICOLOGICAL MATERIAL DUE TO HEPA FILTER LOADING AND SUBSEQUENT FAILURE, THUS REDUCING THE LIKELIHOOD OF HEPA FILTER

FAILURE EVENTS DUE TO THE HEPA FILTER FAILURE – EXPOSURE TO HIGH TEMPERATURE OR PRESSURE ACCIDENT AND (2) TO SHUT DOWN THE VENTILATION SYSTEM WHEN LOW DIFFERENTIAL PRESSURES DETECTED BY THE DIFFERENTIAL PRESSURE SYSTEM, THEREBY LIMITING THE RADIOLOGICAL AND TOXICOLOGICAL MATERIAL RELEASED TO THE ATMOSPHERE AND THUS DECREASING THE CONSEQUENCES OF THE HEPA FILTER FAILURE – EXPOSURE TO HIGH TEMPERATURE AND PRESSURE ACCIDENT."

4.14.1 HEPA Filter Differential Pressure Interlock (DPI) System

The HEPA Filter Differential Pressure Interlock System consists of pressure transmitters for sensing the filter differential pressure (DP), a Programmable Logic Controller (PLC), alarms and interlock circuitry. The PLC cabinet also contains a watchdog timer that activates shutdown of the ventilation system should the PLC fail to periodically send a required reset signal.

SAFETY-SIGNIFICANT COMPONENTS

Pressure Transmitters
The pressure transmitters for the first stage (high DP interlock) and the second stage (low DP Interlock) filters provide the pressure signal necessary to determine when limits have been exceeded. As such they are SS. Detectable failures (out of range signals) of the transmitters result in shutdown of the ventilation system by the PLC, however, there are other failures that may result in loss of safety function.

Programmable Logic Controller (PLC)
The PLC determines whether a limit has been exceeded and activates the interlock to shut down the ventilation system upon detection. The PLC includes the chassis, direct current power supply, central processing unit and all input/output modules.

Fan Status Relay
The DPI system at 702-AZ has interposing relays that provide a voltage signal to the PLC indicating whether either or both fans (trains) are on. This relay is energized when the fan is on. Should the relay fail to energize when the fan is on, the PLC would ignore the differential pressure signals from the associated train. In the event that a low or high DP occurred, the interlock would not be activated. These relays are therefore designated as SS.

Fan Motor Contactor
The fan motor contactor is fail-safe on loss of power, however, it is assumed that failure due to contact welding is credible since it is a current carrying (power) relay.

Watchdog Timer
The watchdog timer senses failure of the PLC and shuts down the ventilation fans. Most failure modes of the timer would result in shutdown and none of the failure modes would inhibit performance of the safety function by the PLC. The watchdog timer, however, has been designated as a functional requirement (FSAR, 4.4.10.3). By definition, (FSAR, Rev G, Section 4.1, page 4-7) "functional requirements are those that are specifically needed to fulfill the

identified safety functions". In order to remain consistent with the current version of the FSAR, the watchdog timer is designated as SS.

Heaters
The cabinet heaters ensure that the environment within the cabinet does not exceed the operating limits of the equipment and degrade performance of the system. As such, the heaters are designated as SS.

GENERAL SERVICE COMPONENTS

Overall DP Transmitter
The DP transmitter for measuring overall DP provides parameter monitoring and is classified as GS.

Alarms
The local annunciator alarm provides the operator indication that a high or low DP or a transmitter failure condition exists. None of the alarms or indicators provide a safety function, however, and are classified as GS.

Interlock Relay
The interlock relay is controlled by the watchdog timer and the PLC output module. The relay is failsafe for all credible failure modes and is therefore classified as GS.

Cabinet Temperature Indicator
The cabinet temperature indicator provides parameter monitoring and is classified as GS.

4.15 ISOLATION VALVES

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.7 WASTE TRANSFER LEAK
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE SAFETY-SIGNIFICANT ISOLATION VALVES IS TO LIMIT THE MISROUTE OF WASTE FROM THE PHYSICALLY CONNECTED TRANSFER ROUTES TO THE PHYSICALLY DISCONNECTED PORTIONS OF THE FACILITY, THUS DECREASING THE CONSEQUENCES OF THE WASTE TRANSFER LEAK ACCIDENT."

TBD

4.16 MASTER PUMP SHUTDOWN SYSTEM

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.3.2.4.7 WASTE TRANSFER LEAK
SAFETY FUNCTIONS: "THE SAFETY FUNCTIONS OF THE MASTER PUMP SHUTDOWN SYSTEM ARE TO: (1) DETECT WASTE TRANSFER SYSTEM LEAKS VIA THE TRANSFER SYSTEM LEAK DETECTORS; (2) PROVIDE AN INTERLOCK TO SUT DOWN THE TRANSFER PUMP; AND (3) PROVIDE AN ALARM TO ALERT ONSITE AND FACILITY WORKERS TO TAKE RESPONSE ACTIONS TO LIMIT EXPOSURE, THUS LIMITING THE

VOLUME OF THE WASTE LEAK AND THE AMOUNT OF TIME THAT WORKERS ARE EXPOSED TO THE LEAKED WASTE THEREBY DECREASING THE CONSEQUENCES OF THE WASTE TRANSFER LEAK ACCIDENT.

ADDITIONAL SAFETY FUNCTIONS OF THE MASTER PUMP SHUTDOWN SYSTEM ARE TO: (1) DETECT WASTE BACKFLOWS VIA THE PRESSURE SWITCH INTERLOCK OR ALARM SYSTEM; (2) PROVIDE AN INTERLOCK TO SHUT DOWN THE TRANSFER PUMP; (3) PROVIDE AN ALARM TO ALERT ONSITE AND FACILITY WORKERS TO TAKE RESPONSE ACTIONS TO LIMIT EXPOSURE, THUS PREVENTING OR MITIGATING A WASTE TRANSFER LEAK FROM THE WASTE TRANSFER SYSTEM, DECREASING THE FREQUENCY OR CONSEQUENCES OF THE WASTE TRANSFER LEAK ACCIDENT."

TBD

4.17 DOUBLE-CONTAINED RECEIVER TANK VENTILATION SYSTEM

SAFETY CLASSIFICATION: SAFETY-SIGNIFICANT
ACCIDENT: 3.4.2.2 FLAMMABLE GAS DEFLAGRATIONS
SAFETY FUNCTIONS: "THE SAFETY FUNCTION OF THE DCRT VENTILATION SYSTEMS IS TO PREVENT THE ACCUMULATION OF FLAMMABLE GASES DUE TO STEADY-STATE RELEASES, THUS DECREASING THE FREQUENCY OF THE FLAMMABLE GAS DEFLAGRATION ACCIDENT.

THE SAFETY FUNCTION OF THE 244-TK-CR-003 VENTILATION SYSTEM IS TO PREVENT THE ACCUMULATION OF FLAMMABLE GASES DUE TO STEADY-STATE RELEASES, THUS DECREASING THE FREQUENCY OF THE FLAMMABLE GAS DEFLAGRATION ACCIDENT."

TBD

5.0 REFERENCES

1. HNF-SD-WM-SAR-067, Tank Farms Final Safety Analysis Report.

2. RPP-DI-ENG-002, Desk Instruction and Method for Determining Safety Classification.

3. HNF-SD-WM-SEL-040, TWRS Facility Safety Equipment List.

6.0 APPENDIX – FAILURE MODES AND EFFECT ANALYSES

This Appendix contains the generic exclusion Failure Modes and Effects Analyses (FMEAs) described in Section 3.0 above.

6.1 Passive Components of a Safety System

PARENT SAFETY SCC: All RPP Safety SSCs	**ENVIRONMENTAL CONDITIONS**	Revision **0**
REFERENCES: 1) HNF-SD-WM-SAR-067, *TANK WASTE REMEDIATION SYSTEM FINAL SAFETY ANALYSIS REPORT* 2) HNF-SD-WM-TSR-006, *TANK FARMS TECHNICAL SAFETY REQUIREMENTS*	**for NORMAL OPERATIONS:** Applies to components and parts subject only to ambient Hanford outdoor or indoor conditions in radiation fields up to ? Rads or to environments of relatively neutral pH (6.5 to 7.5) **for ACCIDENT CONDITIONS:** Applies only to components and parts whose operating environment does not significantly change because of the accidents that the parent safety SSC is designed to prevent or mitigate.	**PREPARED BY** **DATE** RW Reed 24Aug2001 **REVIEW/APPROVAL** **DATE** Per EDT# 629413 10/01/01

COMPONENTS & PARTS <u>INCLUDED</u> IN ANALYZIS:	**COMPONENTS & PARTS <u>NOT INCLUDED</u> IN ANALYZIS:**
☐ non-moving parts of electrical power and control circuits that conduct electricity or that insulate electricity, ☐ overcurrent fuses, ☐ conduit, conduit fittings, gaskets, conduit supports, junction boxes ☐ pipes, pipe fittings, flanges, gaskets, ☐ tubing, tubing fittings, gaskets, ☐ housings and enclosures used for weather protection or industrial safety or construction convenience, ☐ ducting for air handling systems, ☐ ordinary, readily available fasteners, ☐ manually operated valves used for process alignment or for isolation for service, calibration, repair, or maintenance, ☐ structural support members.	☐ those required to move, activate, or change state to perform the safety function, ☐ those that have unique attributes or material properties necessary to perform the safety function, ☐ encasement hose or piping of waste transfer lines, ☐ high strength fasteners relied on to maintain confinement or containment boundary, ☐ items subject to corrosive or otherwise deleterious environments, ☐ items whose failure directly causes one of the accidents postulated in Reference 1 that causes unacceptable on-site or off-site consequences.

SAFETY FUNCTION OF PARENT SAFETY SSC FROM FSAR	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	POTENTIAL CONSEQUENCES OF FAILURE	SAFETY LEVEL
All safety functions listed in Chapter 4 of Reference 1.	Item fails because of corrosion, erosion, or degradation of material properties occurring slowly over time in Hanford's ambient outdoor, or indoor environment.	By definition these components and parts do not have to move, activate, or change state to perform the safety function. Nor, does their failure cause an accident of they fail. Failure of the normal passive design function may or may not lead to degradation or failure of safety function	The rate of degradation of passive components and parts is very slow because of Hanford's normally arid conditions. Safety SSC systems are periodically surveyed for operability or they are tested for operability prior to use. The mean time to failure because of natural elements is orders of magnitude longer than the surveillance periods for these systems. Therefore, it is reasonable to expect that the component or part will continue to provide the safety function until the next surveillance. Or, if the safety SSC passes an operability test prior to use, it is reasonable to expect the system to continue to function for the duration of the activity requiring the safety SSC. If prerequisite operability tests fail, the activity is postponed until the system is fixed. If routine surveillance detects degradations or failures, the plant enters an 'Action Statement' condition per the TSR until the system is fixed	general service
All safety functions listed in Chapter 4 of Reference 1.	Item fails because of misinstallation or reinstallation after repair, calibration. Or manually operated valves and switches are mispositioned.	The safety function may not be provided.	If the passive component or part were originally installed improperly so as to degrade or fail the safety function, that condition would be detected and repaired as part of the normal acceptance or operability Test phase of construction. Likewise, return to service tests, periodic surveillances, and prerequisite operability tests would detect passive components and parts that were reinstalled incorrectly, mispositioned, or misaligned.	general service

6.2 Fail-Safe Components of a Safety System

PARENT SAFETY SCC: All RPP Safety SSCs	**ENVIRONMENTAL CONDITIONS**	Revision **0**
REFERENCES: 1) HNF-SD-WM-SAR-067, *TANK WASTE REMEDIATION SYSTEM FINAL SAFETY ANALYSIS REPORT* 2) HNF-SD-WM-TSR-006, *TANK FARMS TECHNICAL SAFETY REQUIREMENTS*	**for NORMAL OPERATIONS:** Applies to components and parts subject to ambient Hanford outdoor or indoor conditions, or subject to any process environment. **for ACCIDENT CONDITIONS:** Applies to all components and parts, regardless of whether the operating environment changes significantly because of the accidents that the Safety SSC is designed to prevent or mitigate.	**PREPARED BY** **DATE** RW Reed 20Sep2001 **REVIEW/APPROVAL** **DATE** Per EDT# 629413 10/01/01

COMPONENTS & PARTS INCLUDED IN ANALYSIS:	**COMPONENTS & PARTS NOT INCLUDED IN ANALYSIS:**
☐ moving parts of electrical power and control circuits that conduct electricity that allow or interrupt current flow, ☐ solenoid operated valves.	☐ items specifically identified in Reference 1 as Safety-Class or Safety-Significant .

SAFETY FUNCTION OF PARENT SAFETY SSC FROM FSAR	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	POTENTIAL CONSEQUENCES OF FAILURE	SAFETY CLASSIFICATION
All safety functions listed in Chapter 4 of Reference 1.	Failure or degradation from CREDIBLE failure modes, while in active service, causes the item to activate, function, or respond as though there were an accident. (e.g., A credible failure mode for power, current-carrying electrical relays is welding the contacts together. However, that failure mode is not credible for relays subject to low-amperage, signal current of less than 25 v.)	An alarm would be generated and Alarm Response Procedures would be invoked. Engineered shutdown sequences would be automatically completed.	By definition, these components and parts fail in a way that results in a safe plant configuration. The alarm or inadvertent shutdown may cause operating inconvenience and programmatic delays while the cause of the failure is determined and the failed component or part is repaired or replaced. If a routine surveillance detects degradations or failures of the Safety SSC, the plant enters an Action Statement condition per the Reference 2 until the system is fixed.	General Service
All safety functions listed in Chapter 4 of Reference 1.	Failure or degradation from CREDIBLE failure modes, while not in active service or under surveillance, that causes the Safety SSC to be inoperable if placed in active service.	Item fails to pass an operability or functional check as a prerequisite to an activity. Item fails to pass an operability or functional check during routine surveillances.	By definition, these components and parts fail in a way that results in a safe plant configuration. If prerequisite operability tests fail, the activity is postponed until the system is fixed. This may cause operating inconvenience and programmatic delays while the cause of the failure is determined and the failed component or part is repaired or replaced.	General Service

6.3 Electrical Power Distribution System and Components of a Safety System

PARENT SAFETY SCC: All RPP Safety SSCs	**ENVIRONMENTAL CONDITIONS**	Revision **0**
REFERENCES: 1) HNF-SD-WM-SAR-067, *TANK WASTE REMEDIATION SYSTEM FINAL SAFETY ANALYSIS REPORT* 2) HNF-SD-WM-TSR-006, *TANK FARMS TECHNICAL SAFETY REQUIREMENTS*	**for NORMAL OPERATIONS:** Applies to components and parts subject to ambient Hanford outdoor or indoor conditions, or subject to any process environment. **for ACCIDENT CONDITIONS:** Applies to all components and parts, regardless of whether the operating environment changes significantly because of the accidents that the Safety SSC is designed to prevent or mitigate.	**PREPARED BY** **DATE** RW Reed 20Sep2001 **REVIEW/APPROVAL** **DATE** Per EDT# 629413 10/01/01

COMPONENTS & PARTS <u>INCLUDED</u> IN ANALYSIS:	**COMPONENTS & PARTS <u>NOT INCLUDED</u> IN ANALYSIS:**
☐ electrical power systems that support safety SSCs. ☐ electrical circuits that conduct electrical power from the input terminals of the device requiring power, and associated devices (e.g., wire, electrical insulation, electrical insulators, terminal blocks, connectors, fuses, disconnect switches, circuit breakers, junction boxes, conduit, fittings)	☐ Items specifically identified in Reference 1 as Safety-Class or Safety-Significant. ☐ motor contactors that are relied on to shut off power to the motor in order to mitigate an accident.

SAFETY FUNCTION OF PARENT SAFETY SSC FROM FSAR	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	POTENTIAL CONSEQUENCES OF FAILURE	SAFETY CLASSIFICATION
All safety functions listed in Chapter 4 of Reference 1.	Localized loss of electrical power to safety SSC while in active service.	An alarm would be generated and Alarm Response Procedures would be invoked. Engineered shutdown sequences would be automatically completed. Safety SSCs that depend on electrical power for operability may temporarily lose safety function.	The alarm or inadvertent shutdown may cause operating inconvenience and programmatic delays while the cause of the failure is determined and the failed component or part is repaired or replaced. If a routine surveillance detects degradations or failures of the safety SSC, the plant enters an Action Statement condition per the Reference 2 until the system is fixed.	General Service
All safety functions listed in Chapter 4 of Reference 1.	General loss of power to all or substantial portion of tank farms	Motive power would be lost to cause accidents, which are caused by transferring waste. Safety SSCs that depend on electrical power for operability may temporarily lose safety function.	The safety analysis for tank farms has not identified any accidents that could be immediately caused by the loss of electrical power to electrically powered safety SSCs. None of the safety SSCs require continuous electrical power to adequately perform their safety function....The accident analyses show, instead, that electrical power to electrically powered safety SSCs can be interrupted temporarily without significantly compromising facility safety....Approved procedures based on the hazard and accident analyses specify what must be done, and when, in the event that safety SSCs are inoperable because electrical power is not available. Reference 1, Volume 3, 4.5.1.3	General Service

All safety functions listed in Chapter 4 of Reference 1.	Failures while not in active service or under surveillance cause the safety SSC to be inoperable if placed in active service.	Safety SSC fails to pass an operability or functional check as a prerequisite to an activity. Safety SSC fails to pass operability or functional check during routine surveillances.	If prerequisite operability tests fail, the activity is postponed until the system is fixed. This may cause operating inconvenience and programmatic delays while the cause of the failure is determined and the failed component or part is repaired or replaced. If a routine surveillance detects degradations or failures of the safety SSC, the plant enters an Action Statement condition per the Reference 2 until the system is fixed.	General Service

6.4 Compressed Air Delivery System and Components of a Safety System

PARENT SAFETY SCC: All RPP Safety SSCs	ENVIRONMENTAL CONDITIONS	Revision 0
REFERENCES: 1) HNF-SD-WM-SAR-067, *TANK WASTE REMEDIATION SYSTEM FINAL SAFETY ANALYSIS REPORT* 2) HNF-SD-WM-TSR-006, *TANK FARMS TECHNICAL SAFETY REQUIREMENTS*	**for NORMAL OPERATIONS:** Applies to components and parts of the safety SSC that is subject to ambient Hanford outdoor or indoor conditions, or subject to any process environment. **for ACCIDENT CONDITIONS:** Applies to all components and parts of the safety SSC, regardless of whether the operating environment changes significantly because of the accidents that the parent safety SSC is designed to prevent or mitigate.	**PREPARED BY DATE** RW Reed 20Sep2001 **REVIEW/APPROVAL DATE** Per EDT# 629413 10/01/01

COMPONENTS & PARTS **INCLUDED** IN ANALYSIS:	COMPONENTS & PARTS **NOT INCLUDED** IN ANALYSIS:
☐ compressed air systems including compressors, air filters, accumulators, air dryers, control instrumentation, and delivery piping or tubing fittings, and supports. ☐ compressed air systems used for dip tubes that measure tank level. ☐ compressed air systems relied on for ventilation of DCRTs and 244-AR Tk-002.	☐ items specifically identified in Reference 1 as Safety-Class or Safety-Significant .

SAFETY FUNCTION OF PARENT SAFETY SSC FROM FSAR	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	POTENTIAL CONSEQUENCES OF FAILURE	SAFETY CLASSIFICATION
All safety functions listed in Chapter 4 of Reference 1.	Failure, malfunction, or degradation of compressed air system.	Inadequate ventilation flow through 244-AR Tank 002 via dip tubes. Inadequate ventilation flow through DCRTs 244-A, 244-BX, 244-S, 244-TX, and 244-U. Loss of level measurement in DCRTs that employ dip tubes to measure waste level, and failure to implement TSR controls.	Possible increase in concentration of flammable gas in the tank to levels above the Lower Flammability Limit. The compressed air systems require no equipment upgrades or special maintenance activities, and standard industrial maintenance practices are adequate for all anticipated events. TSR controls are identified in the applicable Chapter 4.0 sections for those safety SSCs that require compressed air. Reference 1, Vol. 3, paragraph 4.5.2.5.	General Service

6.5 Monitoring Components of a Safety System

PARENT SAFETY SCC: All RPP Safety SSCs	**ENVIRONMENTAL CONDITIONS**	Revision **0**
REFERENCES: 1) HNF-SD-WM-SAR-067, *TANK WASTE REMEDIATION SYSTEM FINAL SAFETY ANALYSIS REPORT* 2) HNF-SD-WM-TSR-006, *TANK FARMS TECHNICAL SAFETY REQUIREMENTS*	**for NORMAL OPERATIONS:** Applies to components and parts subject to ambient Hanford outdoor or indoor conditions, or subject to any process environment. **for ACCIDENT CONDITIONS:** Applies to all components and parts, regardless of whether the operating environment changes significantly because of the accidents that the parent safety SSC is designed to prevent or mitigate.	**PREPARED BY** **DATE** RW Reed 20Sep2001 **REVIEW/APPROVAL** **DATE** Per EDT# 629413 10/01/01

COMPONENTS & PARTS <u>INCLUDED</u> IN ANALYSIS:	**COMPONENTS & PARTS <u>NOT INCLUDED</u> IN ANALYSIS:**
☐ electrical or electronic monitoring devices used to indicate system status. ☐ mechanical monitoring devices used to indicate system status. ☐ pneumatic monitoring devices used to indicate system status. ☐ devices, instruments, and indicators used to measure process-related parameters for the purpose of regulating or controlling the process. (e.g., pressure indicators, flow meters, ammeters, temperature gages.	☐ items specifically identified in Reference 1 as Safety-Class or Safety-Significant . ☐ items that monitor status or parameters required to perform the safety function. (e.g., temperature monitors where the safety function is to monitor temperature.)

SAFETY FUNCTION OF PARENT SAFETY SSC FROM FSAR	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	POTENTIAL CONSEQUENCES OF FAILURE	SAFETY CLASSIFICATION
All safety functions listed in Chapter 4 of Reference 1.	The monitoring device fails or malfunctions in such a way that the system status appears OK, when it is not.	Loss of ability to easily determine status of safety SSC while in active service.	Failure of the status monitoring device does not render the safety SSC inoperable. By definition, this is not the only method to determine status of the system, so alternative methods to determine status would be employed until the primary (not the only), status monitoring device is repaired or replaced.	General Service
All safety functions listed in Chapter 4 of Reference 1.	The monitoring device fails or malfunctions in such a way that the system status appears not OK, when it is.	Planned activities would be postponed, or ongoing activities would be suspended while malfunctioning monitoring device is repaired or replaced.	Possible operating inconvenience and programmatic delays while the cause of the failure is determined and the failed component or part is repaired or replaced.	General Service

6.6 Components of a Safety System Preventing an Accident Precondition

PARENT SAFETY SCC: Only RPP Safety SSCs that are credited by the FSAR with preventing accidents	**ENVIRONMENTAL CONDITIONS**	Revision **0**
REFERENCES: 1) HNF-SD-WM-SAR-067, *TANK WASTE REMEDIATION SYSTEM FINAL SAFETY ANALYSIS REPORT* 2) HNF-SD-WM-TSR-006, *TANK FARMS TECHNICAL SAFETY REQUIREMENTS*	**for NORMAL OPERATIONS:** Applies to components and parts subject to ambient Hanford outdoor or indoor conditions, or subject to any process environment. **for ACCIDENT CONDITIONS:** Applies to all components and parts, regardless of whether the operating environment changes significantly because of the accidents that the Safety SSC is designed to prevent or mitigate.	**PREPARED BY** **DATE** RW Reed 20Sep2001 **REVIEW/APPROVAL** **DATE** Per EDT# 629413 10/01/01

COMPONENTS & PARTS <u>INCLUDED</u> IN ANALYSIS:	**COMPONENTS & PARTS <u>NOT INCLUDED</u> IN ANALYSIS:**
Only items that meet **ALL** of the following criteria: □ items that are part of a parent Safety SSC that is credited with **preventing accidents by preventing accident conditions from developing** . □ items that are readily available through the commercial, industrial marketplace that can be repaired or replaced. □ items that are relatively simple to repair or replace, (e.g., consumable items, fan belts, light bulbs, fuses) □ items whose failure does not immediately cause the safety margin to be reduced.	□ Items specifically identified in Reference 1 as Safety-Class or Safety-Significant. □ Items that **mitigate accident** frequency or consequences that are required to be operable all the time because the accident could happen at any time. □ fail-safe items (See Generic FMEA for Fail-Safe Components and Parts) □ passive items (See Generic FMEA for Passive Components and Parts)

SAFETY FUNCTION OF PARENT SAFETY SSC FROM FSAR	POTENTIAL FAILURE MODE	POTENTIAL EFFECTS OF FAILURE	POTENTIAL CONSEQUENCES OF FAILURE	SAFETY CLASSIFICATION
Only the safety functions listed in Chapter 4 of Reference 1 that are preventative in nature.	All failure modes that render active, continuous-duty items from performing the safety function.	An alarm would be generated and Alarm Response Procedures would be invoked. (e.g., a broken fan belt fails a DST primary ventilation system which triggers the tank dome-space high pressure alarm. Fan belt is GS) Engineered shutdown sequences would be automatically completed. (e.g., a failed HEPA filter triggers a dp interlock switch which shuts off the primary ventilation fan. HEPA filter is GS) Safety SSC fails to pass operability or functional check during routine, periodic surveillances.	The plant enters an LCO Action condition per the Reference 2, which requires immediate repair or replacement of the failed component or part. The LCO Action condition is based on having a surveillance requirement that provides a reasonable expectation that failure detection and restoration will occur prior to creation of unacceptable, prerequisite accident conditions.	General Service

(this page intentionally left blank)

(this page intentionally left blank)

7.0 Safety Equipment List Database

The following pages constitute the re-defined component safety SSCs for the FSAR safety systems addressed in the Section 4.0 of this document. All component SSCs listed carry the same safety classification as the parent FSAR safety system. All safety system components not included in this listing have been evaluated and judged to carry a safety classification of general-service.

RPP-8792, Section 4.1, Double-Shell and Aging Waste Facility Tank Ventilation Systems

SEL SAFETY SSC SYSTEM INFORMATION

DAs	HID	Safety SSC	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
Gustavson / Dalpaiz	H0039521/ H0013104	DST/AWF Tank Ventilation		SC	HNF-SD-WM-SAR-067	2-D	4.3.2	The safety functions of the DST and AWF tank primary tank ventilation systems are to prevent the accumulation of flammable gases due to steady-state releases, thus decreasing the frequency of the Flammable Gas Deflagrations (FSAR Section 3.4.2.2) accident	The DST and AWF tank primary ventilation systems shall maintain vapor space pressures of all tanks < 0 kPa (< 0 in. WG) relative to atmospheric pressure. Methods that are available to meet this functional requirement for operability are described in FSAR Section 4.3.2.5.	

RPP-8792, Section 4.1, Double-Shell and Aging Waste Facility Tank Ventilation Systems

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-101		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-101	AN241-VTP-M-101	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-101	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-101	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-101	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-101	M12	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-2-71927 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-102		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-102	AN241-VTP-M-102	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-102	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-102	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-102	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AN	AN241	VTP	EF		AN241-VTP-EF-102	M13	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-2-71927 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-101		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-101	AN241-VTP-M-101	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-101	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-101	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-101	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-101	M13	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-2-90476 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-102		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-102	AN241-VTP-M-102	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-102	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2

RPP-8792, Section 4.1, Double-Shell and Aging Waste Facility Tank Ventilation Systems

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-102	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-102	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020103 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AP	AP241	VTP	EF		AP241-VTP-EF-102	M14	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-2-90476 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-101		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-101	AN241-VTP-M-101	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-101	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-101	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-101	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-101	M12	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-2-90928 Sheet 1
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-102		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-102	AN241-VTP-M-102	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-102	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-102	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-102	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020102 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AW	AW241	VTP	EF		AW241-VTP-EF-102	M13	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-2-90928 Sheet 1
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1A		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1A	NA	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1A	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1A	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1A	AZ702-VTP-VSD-1	Fan Variable Speed Drive	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1B		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5

RPP-8792, Section 4.1, Double-Shell and Aging Waste Facility Tank Ventilation Systems

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1B	NA	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1B	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1B	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	EF		AZ-K1-5-1B	AZ702-VTP-VSD-2	Fan Variable Speed Drive	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1A		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1A	NA	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1A	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1A	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1A	AZ702-VTP-VSD-1	Fan Variable Speed Drive	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 4
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1B		Primary Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1B	NA	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1B	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1B	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	EF		AZ-K1-5-1B	AZ702-VTP-VSD-2	Fan Variable Speed Drive	Exhaust fan provides the motive force for developing and maintaining airflow through the primary tank vapor space.		Lack of air flow could allow flammable gas to exceed 25% LFL and exceed TSRs.	H-14-020107 Sheet 5
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	MOV		MK-AY101K1-1		Primary Tank Ventilation Inlet Motor Operated Damper	Provide a flow path for air supplied into the primary tank.		Failure of valve in closed position will prevent airflow into the tank.	H-14-020107 Sheet 1
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	MOV		MK-AY102K1-1		Primary Tank Ventilation Inlet Motor Operated Damper	Provide a flow path for air supplied into the primary tank.		Failure of valve in closed position will prevent airflow into the tank.	H-14-020107 Sheet 1
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	MOV		MK-AZ101K1-1		Primary Tank Ventilation Inlet Motor Operated Damper	Provide a flow path for air supplied into the primary tank.		Failure of valve in closed position will prevent airflow into the tank.	H-14-020107 Sheet 1
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AZ	AZ241	VTP	MOV		MK-AZ102K1-1		Primary Tank Ventilation Inlet Motor Operated Damper	Provide a flow path for air supplied into the primary tank.		Failure of valve in closed position will prevent airflow into the tank.	H-14-020107 Sheet 2
Double-Shell and Aging Waste Facility Primary Tank Ventilation Systems	AY	AY241	VTP	FE		FE-AY101K1-2		Primary Tank Flow Indication Insturmentation Tank Exhaust Outlet	Indicates/verifies rate of exhaust flow from each primary tank.		Inability to verify system is performing safety function and maintaining flow; could lead to a buildup of flammable gases in tank vapor space	H-14-020106 Sheet 1

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC SYSTEM INFORMATION

Safety SSC	DAs	HID	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
Primary Tank Leak Detection - CAMs	Scaief	h0051691	Flammable Gas Deflagration	SC	HNF-SD-WM-SAR-067	2-D	4.3.3	The safety function of the primary tank leak detection systems is to provide an alarm of tank waste from misroutes or other system leaks into the tank annulus to alert operators to take action to prevent a flammable gas deflagration in the DST or AWF tank annulus, thus decreasing the frequency of the Flammable Gas Deflagrations (FSAR Section 3.4.2.2) accident.	The DST and AWF tank annulus ventilation system CAMs shall alarm when radiation levels exceeding a preset level are detected.	

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	CAM	B-4.01	AN901-WSTA-CAM-102		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	FCV		AN901-WSTA-FCV-102		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	P		AN901-WSTA-P-002		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	XL		AN901-WSTA-XL-102		Local Alarm Light	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN271	WSTA	ANN		AN271-WSTA-ANN-102-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	CAM		AN901-WSTA-CAM-103		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	FCV		AN901-WSTA-FCV-103		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	P		AN901-WSTA-P-003		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	XL		AN901-WSTA-XL-103		Local Alarm Light	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN271	WSTA	ANN		AN271-WSTA-ANN-103-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	TS		AN901-WSTA-TS-101		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	F		AN901-WSTA-F-101A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	F		AN901-WSTA-F-101B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs		AN901	WSTA	TS		AN901-WSTA-TS-111		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	HTR		AN901-WSTA-HTR-111		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN901	WSTA	HT		AN901-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	CAM	B-4.01	AN902-WSTA-CAM-101		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	FCV		AN902-WSTA-FCV-101		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	P		AN902-WSTA-P-001		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	XL		AN902-WSTA-XL-101		Local Alarm Light	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN271	WSTA	ANN		AN271-WSTA-ANN-101-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	CAM		AN902-WSTA-CAM-104		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	FCV		AN902-WSTA-FCV-104		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	P		AN902-WSTA-P-004		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	XL		AN902-WSTA-XL-104		Local Alarm Light	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN271	WSTA	ANN		AN271-WSTA-ANN-104-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	TS		AN902-WSTA-TS-102		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	F		AN902-WSTA-F-102A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	F		AN902-WSTA-F-102B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs		AN902	WSTA	TS		AN902-WSTA-TS-112		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	HTR		AN902-WSTA-HTR-112		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN902	WSTA	HT		AN902-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	CAM	B-4.01	AN903-WSTA-CAM-105		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	FCV		AN903-WSTA-FCV-105		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	P		AN903-WSTA-P-005		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	XL		AN903-WSTA-XL-105		Local Alarm Light	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN271	WSTA	ANN		AN271-WSTA-ANN-105-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	CAM		AN903-WSTA-CAM-106		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	FCV		AN903-WSTA-FCV-106		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	P		AN903-WSTA-P-006		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	XL		AN903-WSTA-XL-106		Local Alarm Light	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN271	WSTA	ANN		AN271-WSTA-ANN-106-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	TS		AN903-WSTA-TS-103		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	F		AN903-WSTA-F-103A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	F		AN903-WSTA-F-103B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs		AN903	WSTA	TS		AN903-WSTA-TS-113		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	HTR		AN903-WSTA-HTR-113		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN903	WSTA	HT		AN903-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	CAM	B-4.01	AN904-WSTA-CAM-107		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	FCV		AN904-WSTA-FCV-107		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	P		AN904-WSTA-P-007		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	XL		AN904-WSTA-XL-107		Local Alarm Light	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN271	WSTA	ANN		AN271-WSTA-ANN-107-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	TS		AN904-WSTA-TS-104		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	F		AN904-WSTA-F-104A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	F		AN904-WSTA-F-104B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs		AN904	WSTA	TS		AN904-WSTA-TS-114		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	HTR		AN904-WSTA-HTR-114		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AN	AN904	WSTA	HT		AN904-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020501 Sheet 8
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	CAM	B-4.02	AP901-WSTA-CAM-102		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 9

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	PCV		AP901-WSTA-PCV-102		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	P		AP901-WSTA-P-102		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-102-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	CAM	B-4.02	AP901-WSTA-CAM-104		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	PCV		AP901-WSTA-PCV-104		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	P		AP901-WSTA-P-104		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-104-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	IL		AP901-WSTA-IL-TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	TS		AP901-WSTA-TS-133		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	F		AP901-WSTA-F-133A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	F		AP901-WSTA-F-133B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	TS		AP901-WSTA-TS-134		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	HTR		AP901-WSTA-HTR-134		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP901	WSTA	HT		AP901-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	CAM	B-4.02	AP902-WSTA-CAM-101		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	PCV		AP902-WSTA-PCV-101		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	P		AP902-WSTA-P-101		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-101-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	CAM	B-4.02	AP902-WSTA-CAM-103		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	PCV		AP902-WSTA-PCV-103		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	P		AP902-WSTA-P-103		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-103-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	IL		AP902-WSTA-IL-TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	TS		AP902-WSTA-TS-131		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	F		AP902-WSTA-F-131A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	F		AP902-WSTA-F-131B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	TS		AP902-WSTA-TS-132		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	HTR		AP902-WSTA-HTR-132		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP902	WSTA	HT		AP902-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020503 Sheet 9
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	CAM	B-4.02	AP903-WSTA-CAM-105		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 10

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	PCV		AP903-WSTA-PCV-105		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	P		AP903-WSTA-P-105		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-105-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	CAM	B-4.02	AP903-WSTA-CAM-107		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	PCV		AP903-WSTA-PCV-107		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	P		AP903-WSTA-P-107		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-107-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	IL		AP902-WSTA-IL-TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	TS		AP903-WSTA-TS-135		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	F		AP903-WSTA-F-135A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	F		AP903-WSTA-F-135B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	TS		AP903-WSTA-TS-136		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	HTR		AP903-WSTA-HTR-136		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP903	WSTA	HT		AP903-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	CAM	B-4.02	AP904-WSTA-CAM-106		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	PCV		AP904-WSTA-PCV-106		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	P		AP904-WSTA-P-106		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-106-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	CAM	B-4.02	AP904-WSTA-CAM-108		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	PCV		AP904-WSTA-PCV-108		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	P		AP904-WSTA-P-108		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP271	WSTA	ANN		AP271-WSTA-ANN-108-14		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	IL		AP904-WSTA-IL-TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	TS		AP904-WSTA-TS-137		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	F		AP904-WSTA-F-137A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	F		AP904-WSTA-F-137B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	TS		AP904-WSTA-TS-138		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	HTR		AP904-WSTA-HTR-138		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AP	AP904	WSTA	HT		AP904-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020503 Sheet 10
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	CAM	B-4.03	AW901-WSTA-CAM-101		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020502 Sheet 7

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	IL		AW901-WSTA-IL-1TBD		Local Red Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW271	WSTA	ANN		AW271-WSTA-ANN-101-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	CAM		AW901-WSTA-CAM-103		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	IL		AW901-WSTA-IL-3TBD		Local Red Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW271	WSTA	ANN		AW271-WSTA-ANN-103-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	PRV		AW901-WSTA-PRV-107		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	P		AW901-WSTA-P-001		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	TS		AW901-WSTA-TS-107		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	F		AW901-WSTA-F-107A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	F		AW901-WSTA-F-107B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	TS		AW901-WSTA-TS-111A		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	TS		AW901-WSTA-TS-111B		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	HTR		AW901-WSTA-HTR-111		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW901	WSTA	HT		AW901-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	CAM	B-4.03	AW902-WSTA-CAM-105		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	IL		AW902-WSTA-IL-5TBD		Local Red Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW271	WSTA	ANN		AW271-WSTA-ANN-105-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	CAM		AW902-WSTA-CAM-106		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	IL		AW902-WSTA-IL-6TBD		Local Red Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW271	WSTA	ANN		AW271-WSTA-ANN-106-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	PRV		AW902-WSTA-PRV-109		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	P		AW902-WSTA-P-005		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	TS		AW902-WSTA-TS-109		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	F		AW902-WSTA-F-109A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	F		AW902-WSTA-F-109B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	TS		AW902-WSTA-TS-113A		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	TS		AW902-WSTA-TS-113B		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	HTR		AW902-WSTA-HTR-113		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW902	WSTA	HT		AW902-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	CAM	B-4.03	AW903-WSTA-CAM-102		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	IL		AW903-WSTA-IL-2TBD		Local Red Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020502 Sheet 7

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - CAMs	AW	AW271	WSTA	ANN		AW271-WSTA-ANN-102-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	CAM		AW903-WSTA-CAM-104		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	IL		AW903-WSTA-IL-4TBD		Local Red Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW271	WSTA	ANN		AW271-WSTA-ANN-104-06		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	PRV		AW903-WSTA-PRV-108		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	P		AW903-WSTA-P-002		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	TS		AW903-WSTA-TS-108		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	F		AW903-WSTA-F-108A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	F		AW903-WSTA-F-108B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	TS		AW903-WSTA-TS-112A		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	TS		AW903-WSTA-TS-112B		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	HTR		AW903-WSTA-HTR-112		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AW	AW903	WSTA	HT		AW903-WSTA-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020502 Sheet 7
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	CAM	B-4.04	AY101-WSTA-CAM-101		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	FCV		AY101-WSTA-FCV-101		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	P		AY101-WSTA-P-001		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	TS		AY101-WSTA-TS-101		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	F		AY101-WSTA-F-101		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	TS		AY101-WSTA-TS-111		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	HTR		AY101-WSTA-HTR-111		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	HT		AY101-WSTA-HT-1TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY101	WSTA	IL		AY101-WSTA-IL-1TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	A271	WSTA	ANN		A271-WSTA-ANN-A3-4-2		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	CAM	B-4.04	AY102-WSTA-CAM-102		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	FCV		AY102-WSTA-FCV-102		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	P		AY102-WSTA-P-002		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	TS		AY102-WSTA-TS-102		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	F		AY102-WSTA-F-102		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	TS		AY102-WSTA-TS-112		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	HTR		AY102-WSTA-HTR-112		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020506 Sheet 3

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	HT		AY102-WSTA-HT-2TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	AY102	WSTA	IL		AY102-WSTA-IL-2TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AY	A271	WSTA	ANN		A271-WSTA-ANN-A3-8-2		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020506 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	CAM	B-4.04	AZ101-WSTA-CAM-101		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	FCV		AZ101-WSTA-FCV-101		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	P		AZ101-WSTA-P-001		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	TS		AZ101-WSTA-TS-101		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	F		AZ101-WSTA-F-101		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	TS		AZ101-WSTA-TS-111		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	HTR		AZ101-WSTA-HTR-111		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	HT		AZ101-WSTA-HT-1TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ101	WSTA	IL		AZ101-WSTA-IL-1TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	A271	WSTA	ANN		A271-WSTA-ANN-A4-7-2		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	CAM	B-4.04	AZ102-WSTA-CAM-102		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	FCV		AZ102-WSTA-FCV-102		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	P		AZ102-WSTA-P-002		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	TS		AZ102-WSTA-TS-102		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	F		AZ102-WSTA-F-102		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	TS		AZ102-WSTA-TS-112		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	HTR		AZ102-WSTA-HTR-112		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	HT		AZ102-WSTA-HT-2TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	AZ102	WSTA	IL		AZ102-WSTA-IL-2TBD		Local White Alarm Strobe	Provide local high radiation alarm indication		Burn out/Loss of local visual alarm	H-14-020507 Sheet 3
Primary Tank Leak Detection - CAMs	AZ	A271	WSTA	ANN		A271-WSTA-ANN-A4-7-4		Annunciator Window System	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020507 Sheet 3
ANNULUS VENT SYSTEM												
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-003		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-003	AN241-VTA-M-003	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-003	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-003	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-003	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-003	M10	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-71927 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-004		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-004	AN241-VTA-M-004	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-004	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-004	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-004	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020101 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AN	AN241	VTA	EF		AN241-VTA-EF-004	M11	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-71927 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-003		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-003	AN241-VTA-M-003	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-003	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-003	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-003	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-003	M11	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-90476 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-004		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-004	AP241-VTA-M-004	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-004	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-004	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-004	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020203 Sheet 3
Double-Shell and Aging Waste Facility Annulus Ventilation System	AP	AP241	VTA	EF		AP241-VTA-EF-004	M12	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-90476 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-003		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-003	AW241-VTA-M-003	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-003	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-003	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-003	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-003	M10	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-70325 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-004		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-004	AW241-VTA-M-004	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-004	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-004	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-004	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020202 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AW	AW241	VTA	EF		AW241-VTA-EF-004	M11	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-70325 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K1-3-2		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K1-3-2	NA	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K1-3-2	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K1-3-2	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K1-3-2	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K1-3-2	M1	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-92482 Sheet 1
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K2-3-2		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K2-3-2	NA	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K2-3-2	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K2-3-2	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2

RPP-8792, Section 4.2.1, Primary Tank Leak Detection - CAMS

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K2-3-2	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020206 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AY	AY241	VTA	EF		K2-3-2	M2	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-2-92482 Sheet 1
Double-Shell and Aging Waste Facility Annulus Ventilation System	AZ	AZ241	VTA	EF		K1-3-2		Annulus Ventilation System Exhaust Fan Assembly	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020207 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AZ	AZ241	VTA	EF		K1-3-2	NA	Fan Motor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020207 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AZ	AZ241	VTA	EF		K1-3-2	NA	Fan Impeller	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020207 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AZ	AZ241	VTA	EF		K1-3-2	NA	Fan Housing	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020207 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AZ	AZ241	VTA	EF		K1-3-2	NA	Fan and Motor Sheaves	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-020207 Sheet 2
Double-Shell and Aging Waste Facility Annulus Ventilation System	AZ	AZ241	VTA	EF		K1-3-2	NA	Motor Contactor	Exhaust fan provides the motive force for developing and maintaining airflow through the annulus space.		Operability of the CAM primary tank leak detection system is dependent on the operation of the annulus ventilation system.	H-14-030007 Sheet 2

RPP-8792, Section 4.2.2, Primary Tank Leak Detection - Level/Conductivity

SEL SAFETY SSC SYSTEM INFORMATION

Safety SSC	DAs	HID	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
Primary Tank Leak Detection - Level & Conductivity	Scaief	h0051691	Flammable Gas Deflagration	SC	HNF-SD-WM-SAR-067	2-D	4.3.3	The safety function of the primary tank leak detection systems is to provide an alarm of tank waste from misroutes or other system leaks into the tank annulus to alert operators to take action to prevent a flammable gas deflagration in the DST or AWF tank annulus, thus decreasing the frequency of the Flammable Gas Deflagrations (FSAR Section 3.4.2.2) accident.	The DST and AWF tank annulus conductivity probes or ENRAFs shall be able to detect a 2.54-cm (1.0-in.) deep accumulation of waste in the bottom of the DST annulus and shall provide an audible alarm signal and an annunciator panel light upon detection of waste.	

RPP-8792, Section 4.2.2, Primary Tank Leak Detection - Level/Conductivity

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection Level and Conductivity	AN	AN101	WSTA	LDK	B-4.01	LDK-101-2 THRU LDK-101-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020501 Sheet 1 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN271	WSTA	ANN		AN271-ANN-101-04		Annunciator Window System - LDA-151	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 1 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN102	WSTA	LDK		LDK-102-2 THRU LDK-102-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020501 Sheet 2 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN271	WSTA	ANN		AN271-ANN-102-04		Annunciator Window System - LDA-152	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 2 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN103	WSTA	LDK		LDK-103-2 THRU LDK-103-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020501 Sheet 2 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN271	WSTA	ANN		AN271-ANN-103-04		Annunciator Window System - LDA-153	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 3 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN104	WSTA	LDK		LDK-104-2 THRU LDK-104-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020501 Sheet 2 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN271	WSTA	ANN		AN271-ANN-104-04		Annunciator Window System - LDA-154	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 4 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN105	WSTA	LDK		LDK-105-2 THRU LDK-105-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020501 Sheet 2 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN271	WSTA	ANN		AN271-ANN-105-04		Annunciator Window System - LDA-155	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 5 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN106	WSTA	LDK		LDK-106-2 THRU LDK-106-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020501 Sheet 2 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN271	WSTA	ANN		AN271-ANN-106-04		Annunciator Window System - LDA-156	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 6 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN107	WSTA	LDK		LDK-107-2 THRU LDK-107-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020501 Sheet 2 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AN	AN271	WSTA	ANN		AN271-ANN-107-04		Annunciator Window System - LDA-157	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020501 Sheet 7 H-2-71959 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AP	AP101	WSTA	LDK	B-4.02	LDK-101-2 THRU LDK-101-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 1 H-2-90476 Sheet 8, 16
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-101-09		Annunciator Window System - LDA-121	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 1
Primary Tank Leak Detection Level and Conductivity	AP	AP102	WSTA	LDK		LDK-102-2 THRU LDK-102-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 2 H-2-90476 Sheet 8, 16
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-102-09		Annunciator Window System - LDA-122	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AP	AP103	WSTA	LDK		LDK-103-2 THRU LDK-103-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 3 H-2-90476 Sheet 8, 16
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-103-09		Annunciator Window System - LDA-123	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 3
Primary Tank Leak Detection Level and Conductivity	AP	AP104	WSTA	LDK		LDK-104-2 THRU LDK-104-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 4 H-2-90476 Sheet 8, 16

RPP-8792, Section 4.2.2, Primary Tank Leak Detection - Level/Conductivity

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-104-09		Annunciator Window System - LDA-124	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 4
Primary Tank Leak Detection Level and Conductivity	AP	AP105	WSTA	LDK		LDK-105-2 THRU LDK-105-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 5 H-2-90476 Sheet 8, 16
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-105-09		Annunciator Window System - LDA-125	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 5
Primary Tank Leak Detection Level and Conductivity	AP	AP106	WSTA	LDK		LDK-106-2 THRU LDK-106-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 6 H-2-90476 Sheet 8, 16
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-106-09		Annunciator Window System - LDA-126	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 6
Primary Tank Leak Detection Level and Conductivity	AP	AP107	WSTA	LDK		LDK-107-2 THRU LDK-107-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 7 H-2-90476 Sheet 8, 16
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-107-09		Annunciator Window System - LDA-127	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 7
Primary Tank Leak Detection Level and Conductivity	AP	AP108	WSTA	LDK		LDK-108-2 THRU LDK-108-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020503 Sheet 8 H-2-90476 Sheet 8, 16
Primary Tank Leak Detection Level and Conductivity	AP	AP271	WSTA	ANN		AP271-ANN-108-09		Annunciator Window System - LDA-128	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020503 Sheet 8
Primary Tank Leak Detection - Level & Conductivity	AW	AW101	WSTA	LDK	B-4.03	LDK-101-2 THRU LDK-101-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020502 Sheet 1 H-2-70362 Sheet 1, 3
Primary Tank Leak Detection Level and Conductivity	AW	AW271	WSTA	ANN		AW271-ANN-101-04		Annunciator Window System - LDA-151	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 1
Primary Tank Leak Detection Level and Conductivity	AW	AW102	WSTA	LDK		LDK-102-2 THRU LDK-102-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020502 Sheet 2 H-2-70362 Sheet 1, 3
Primary Tank Leak Detection Level and Conductivity	AW	AW271	WSTA	ANN		AW271-ANN-102-04		Annunciator Window System - LDA-152	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 2
Primary Tank Leak Detection Level and Conductivity	AW	AW103	WSTA	LDK		LDK-103-2 THRU LDK-103-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020502 Sheet 3 H-2-70362 Sheet 1, 3
Primary Tank Leak Detection Level and Conductivity	AW	AW271	WSTA	ANN		AW271-ANN-103-04		Annunciator Window System - LDA-153	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 3
Primary Tank Leak Detection Level and Conductivity	AW	AW104	WSTA	LDK		LDK-104-2 THRU LDK-104-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020502 Sheet 4 H-2-70362 Sheet 1, 3
Primary Tank Leak Detection Level and Conductivity	AW	AW271	WSTA	ANN		AW271-ANN-104-04		Annunciator Window System - LDA-154	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 4
Primary Tank Leak Detection Level and Conductivity	AW	AW105	WSTA	LDK		LDK-105-2 THRU LDK-105-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020502 Sheet 5 H-2-70362 Sheet 1, 3
Primary Tank Leak Detection Level and Conductivity	AW	AW271	WSTA	ANN		AW271-ANN-105-04		Annunciator Window System - LDA-155	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 5
Primary Tank Leak Detection Level and Conductivity	AW	AW106	WSTA	LDK		LDK-106-2 THRU LDK-106-4		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020502 Sheet 6 H-2-70362 Sheet 1, 3
Primary Tank Leak Detection Level and Conductivity	AW	AW271	WSTA	ANN		AW271-ANN-106-04		Annunciator Window Ssytem - LDA-156	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020502 Sheet 6

RPP-8792, Section 4.2.2, Primary Tank Leak Detection - Level/Conductivity

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Primary Tank Leak Detection - Level & Conductivity	AY	AY101	WSTA	LDK	B-4.04	AY101-WSTA-LDK-101-1		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020506 Sheet 1 H-2-64370 Sheet 3
Primary Tank Leak Detection Level and Conductivity	AY	A271	WSTA	ANN		A271-WSTA-ANN-A3-4-1		Annunciator Window System - LDA-150	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020506 Sheet 1
Primary Tank Leak Detection Level and Conductivity	AY	AY102	WSTA	LDK		AY102-WSTA-LDK-102-1		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020506 Sheet 2 H-2-64370 Sheet 3
Primary Tank Leak Detection Level and Conductivity	AY	A271	WSTA	ANN		A271-WSTA-ANN-A3-8-1		Annunciator Window System - LDA-250	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020506 Sheet 2
Primary Tank Leak Detection - Level & Conductivity	AZ	AZ101	WSTA	LDK	B-4.04	AZ101-WSTA-LDK-101-1		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020507 Sheet 1 H-2-68340 Sheet 1
Primary Tank Leak Detection Level and Conductivity	AZ	A271	WSTA	ANN		A271-WSTA-ANN-A4-6-2		Annunciator Window System - LDA-101-1A	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020507 Sheet 1
Primary Tank Leak Detection Level and Conductivity	AZ	AZ102	WSTA	LDK		AZ102-WSTA-LDK-102-1		Leak Detection Relay	Actuate when liquid is detected		Various/Failure to actuate when required	H-14-020507 Sheet 2 H-2-68340 Sheet 1
Primary Tank Leak Detection Level and Conductivity	AZ	A271	WSTA	ANN		A271-WSTA-ANN-A4-6-4		Annunciator Window System - LDA-102-1A	Indicate alarm status		Unknown/Loss of alarm indication	H-14-020507 Sheet 2

RPP-8792, Section 4.7.1, HEPA Filter Failure - Exposure to High Temperature or Pressure

SEL SAFETY SSC SYSTEM INFORMATION

DAs	HID	Safety SSC	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
Gustavson / Dalpaiz	H0039521/ H0013104	HEPA Filters	HEPA Filter Failure- Exposure to High Temperature or Pressure	SS	HNF-SD-WM-SAR-067	2-D	4.4.3	The safety function of the ventilation system HEPA filters is to provide HEPA filtration of headspace gases before their release to the environment, thus reducing the likelihood of unfiltered releases due to partial HEPA filter release events associated with the HEPA Filter Failure- Exposure to High Temperature or Pressure (FSAR Section 3.3.2.4.2) accident.	HEPA filter units shall: Remove at least 99.95% of particles of an approved challenge aerosol that are as small as 0.3 μm. Resist degradation when exposed to ionizing radiation and caustic vapors. Resist damage caused by moisture buildup on the filter media. Resist leakage when exposed to a differential flow stream pressure of 2.49 kPa (10 in. WG).	

RPP-8792, Section 4.7.1, HEPA Filter Failure - Exposure to High Temperature or Pressure

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
HEPA FILTER UNITS SAFETY-SIGNIFICANT												
High Efficiency Particulate Air Filter Units	AN	AN241	VTP	FLT		AN241-VTP-FLT-302		High Efficiency Particulate Air Filter; 1st Bank Train A	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020101 Sheet 3
High Efficiency Particulate Air Filter Units	AN	AN241	VTP	FLT		AN241-VTP-FLT-402		High Efficiency Particulate Air Filter; 1st Bank Train B	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020101 Sheet 3
High Efficiency Particulate Air Filter Units	AN	AN241	VTP	FLT		AN241-VTP-FLT-303		High Efficiency Particulate Air Filter; 2nd Bank Train A	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020101 Sheet 3
High Efficiency Particulate Air Filter Units	AN	AN241	VTP	FLT		AN241-VTP-FLT-403		High Efficiency Particulate Air Filter; 2nd Bank Train B	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020101 Sheet 3
High Efficiency Particulate Air Filter Units	AP	AP241	VTP	FLT		AP241-VTP-FLT-302		High Efficiency Particulate Air Filter; 1st Bank Train A	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020103 Sheet 2
High Efficiency Particulate Air Filter Units	AP	AP241	VTP	FLT		AP241-VTP-FLT-402		High Efficiency Particulate Air Filter; 1st Bank Train B	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020103 Sheet 2
High Efficiency Particulate Air Filter Units	AP	AP241	VTP	FLT		AP241-VTP-FLT-303		High Efficiency Particulate Air Filter; 2nd Bank Train A	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020103 Sheet 2
High Efficiency Particulate Air Filter Units	AP	AP241	VTP	FLT		AP241-VTP-FLT-403		High Efficiency Particulate Air Filter; 2nd Bank Train B	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020103 Sheet 2
High Efficiency Particulate Air Filter Units	AW	AW241	VTP	FLT		AP241-VTP-FLT-302		High Efficiency Particulate Air Filter; 1st Bank Train A	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020102 Sheet 2
High Efficiency Particulate Air Filter Units	AW	AW241	VTP	FLT		AW241-VTP-FLT-402		High Efficiency Particulate Air Filter; 1st Bank Train B	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020102 Sheet 2
High Efficiency Particulate Air Filter Units	AW	A241	VTP	FLT		AW241-VTP-FLT-303		High Efficiency Particulate Air Filter; 2nd Bank Train A	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020102 Sheet 2
High Efficiency Particulate Air Filter Units	AW	AW241	VTP	FLT		AW241-VTP-FLT-403		High Efficiency Particulate Air Filter; 2nd Bank Train B	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020102 Sheet 2
High Efficiency Particulate Air Filter Units	AZ	AZ241	VTP	FLT		AZ-K1-4-1A		High Efficiency Particulate Air Filter; 1st Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 4
High Efficiency Particulate Air Filter Units	AZ	AZ241	VTP	FLT		AZ-K1-4-2A		High Efficiency Particulate Air Filter; 2nd Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 4
High Efficiency Particulate Air Filter Units	AZ	AZ241	VTP	FLT		AZ-K1-4-1B		High Efficiency Particulate Air Filter; 1st Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 5
High Efficiency Particulate Air Filter Units	AZ	AZ241	VTP	FLT		AZ-K1-4-2B		High Efficiency Particulate Air Filter; 2nd Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 5
High Efficiency Particulate Air Filter Units	AY	AY241	VTP	FLT		AZ-K1-4-1A		High Efficiency Particulate Air Filter; 1st Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 4
High Efficiency Particulate Air Filter Units	AY	AY241	VTP	FLT		AZ-K1-4-2A		High Efficiency Particulate Air Filter; 2nd Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 4
High Efficiency Particulate Air Filter Units	AY	AY241	VTP	FLT		AZ-K1-4-1B		High Efficiency Particulate Air Filter; 1st Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 5
High Efficiency Particulate Air Filter Units	AY	AY241	VTP	FLT		AZ-K1-4-2B		High Efficiency Particulate Air Filter; 2nd Bank	Provide HEPA filtration of headspace gases before their release to the environment.		Filter breach would lead to unfiltered release of tank headspace gases to the environment.	H-14-020107 Sheet 5

RPP-8792, Section 4.9, Tank Level Detection System

SEL SAFETY SSC SYSTEM INFORMATION

Safety SSC	DAs	HID	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
Tank Level Detection	Scaief	h0051691	Tank Bump	SS	HNF-SD-WM-SAR-067	2-D	4.4.5	The safety function of the tank level detection systems is to support the implementation of the level-dependent tank temperature controls, thus decreasing the frequency of the Tank Bump (FSAR Section 3.4.2.11) accident.	The level detection systems for all DSTs and AWF tanks are required to measure tank waste levels above 4.6 m (15 ft) and to transmit the data to local or remote level indicator. The tank level detection systems shall measure waste levels and be calibrated (as appropriate to the specific equipment being used).	

RPP-8792, Section 4.9, Tank Level Detection System

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Tank Level Detection	AN	AN101	WST	LIT	B-5.01	AN101-WST-LIT-104		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020601 Sheet 1
Tank Level Detection	AN	AN102	WST	LIT		AN102-WST-LIT-104		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020601 Sheet 2
Tank Level Detection	AN	AN103	WST	LIT		AN103-WST-LIT-104		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020601 Sheet 3
Tank Level Detection	AN	AN104	WST	LIT		AN104-WST-LIT-104		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020601 Sheet 4
Tank Level Detection	AN	AN105	WST	LIT		AN105-WST-LIT-104		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020601 Sheet 5
Tank Level Detection	AN	AN106	WST	LIT		AN106-WST-LIT-104		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020601 Sheet 6
Tank Level Detection	AN	AN107	WST	LIT		AN107-WST-LIT-104		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020601 Sheet 7
Tank Level Detection	AP	AP101	WST	LIT	B-5.02	AP101-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 1
Tank Level Detection	AP	AP102	WST	LIT		AP102-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 2
Tank Level Detection	AP	AP103	WST	LIT		AP103-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 3
Tank Level Detection	AP	AP104	WST	LIT		AP104-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 4
Tank Level Detection	AP	AP105	WST	LIT		AP105-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 5
Tank Level Detection	AP	AP106	WST	LIT		AP106-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 6
Tank Level Detection	AP	AP107	WST	LIT		AP107-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 7
Tank Level Detection	AP	AP108	WST	LIT		AP108-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020603 Sheet 8
Tank Level Detection	AW	AW101	WST	LIT	B-5.03	AW101-WST-LIT-106		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020602 Sheet 1
Tank Level Detection	AW	AW102	WST	LIT		AW102-WST-LIT-106		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020602 Sheet 2
Tank Level Detection	AW	AW103	WST	LIT		AW103-WST-LIT-106		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020602 Sheet 3
Tank Level Detection	AW	AW104	WST	LIT		AW104-WST-LIT-106		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020602 Sheet 4
Tank Level Detection	AW	AW105	WST	LIT		AW105-WST-LIT-106		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020602 Sheet 5
Tank Level Detection	AW	AW106	WST	LIT		AW106-WST-LIT-106		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020602 Sheet 6
Tank Level Detection	AY	AY101	WST	LIT	B-5.04A B-5.04B	AY101-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020606 Sheet 1
Tank Level Detection	AY	AY102	WST	LIT		AY102-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020606 Sheet 2
Tank Level Detection	AZ	AZ101	WST	LIT	B-5.04A B-5.04B	AZ101-WST-LIT-135		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020607 Sheet 1
Tank Level Detection	AZ	AZ102	WST	LIT		AZ102-WST-LIT-101		Enraf Level Gauge	Measure waste level above 15 feet		Various/Loss of level information	H-14-020607 Sheet 2

RPP-8792, Section 4.10.1, DST/AWF Temperature Monitoring System

SEL SAFETY SSC SYSTEM INFORMATION

Safety SSC	DAs	HID	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
DST/AWF Temperature Monitoring	Scaief	h0051691	Organic-Salt Nitrate Reaction and Protection of Safety Limit	SS	HNF-SD-WM-SAR-067	2-D	4.4.6	The safety function of the temperature monitoring systems, when required by SL 2.1.1, (HNF-SD-WM-TSR-006), is to provide tank waste temperature information for operator monitoring, enabling operators to take actions necessary to prevent exceeding waste temperatures at which organic salt-nitrate reactions could proceed, thus decreasing the frequency of the Organic Salt-Nitrate Reaction (FSAR Section 3.4.2.6) accident.	The temperature monitoring systems shall be capable of detecting and displaying the temperature of tank waste over the full range of tank operations, including temperatures resulting from a loss of cooling event.	
DST/AWF Temperature Monitoring	Scaief	h0051691	Tank Bump	SS	HNF-SD-WM-SAR-067	2-D	4.4.6	The safety function of the temperature monitoring systems is to provide tank waste temperature information for operator monitoring, enabling operators to take actions necessary to prevent exceeding temperatures at which significant tank bumps or steam release events could occur, thus decreasing the frequency of the Tank Bump (FSAR Section 3.4.2.11) accident.	The temperature monitoring systems shall be capable of detecting and displaying the temperature of tank waste over the full range of tank operations, including temperatures resulting from a loss of cooling event.	

RPP-8792, Section 4.10.1, DST/AWF Temperature Monitoring System

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
DST/AWF Temperature Monitoring	GEN	POR	WST	TI		TI-001 THRU TI-XXX		Portable Temp Indicators	Convert millivolt to temperature and display		Various/Incorrect temperature displayed	Recorded in the JCS data base as TI or DTI (no location prefix) using Procedure 6-GENI 135
DST/AWF Temperature Monitoring	AN	AN271	WST	TI		AN271-WST-TI-101		Temperature Indicator	Convert millivolt to temperature and display		Various/Incorrect temperature displayed	H-14-020601 Sheets 1-3
DST/AWF Temperature Monitoring	AN	AN271	WST	TI		AN271-WST-TI-102		Temperature Indicator	Convert millivolt to temperature and display		Various/Incorrect temperature displayed	H-14-020601 Sheets 4-7
DST/AWF Temperature Monitoring	AN	AN101	WST	TE	B-6.01	AN101-WST-TE-036 thru AN101-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 1
DST/AWF Temperature Monitoring	AN	AN102	WST	TE		AN102-WST-TE-036 thru AN102-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 2
DST/AWF Temperature Monitoring	AN	AN103	WST	TE		AN103-WST-TE-001 thru AN103-WST-TE-022		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 3
DST/AWF Temperature Monitoring	AN	AN103	WST	TE		AN103-WST-TE-036 thru AN103-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 3
DST/AWF Temperature Monitoring	AN	AN104	WST	TE		AN104-WST-TE-001 thru AN104-WST-TE-022		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 4
DST/AWF Temperature Monitoring	AN	AN104	WST	TE		AN104-WST-TE-036 thru AN104-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 4
DST/AWF Temperature Monitoring	AN	AN105	WST	TE		AN105-WST-TE-001 thru AN105-WST-TE-022		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 5
DST/AWF Temperature Monitoring	AN	AN105	WST	TE		AN105-WST-TE-036 thru AN105-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 5
DST/AWF Temperature Monitoring	AN	AN106	WST	TE		AN106-WST-TE-036 thru AN106-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 6
DST/AWF Temperature Monitoring	AN	AN107	WST	TE		AN107-WST-TE-036 thru AN107-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020601 Sheet 7
DST/AWF Temperature Monitoring	AP	AP101	WST	TE	B-6.02	AP101-WST-TE-036 thru AP101-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 1
DST/AWF Temperature Monitoring	AP	AP102	WST	TE		AP102-WST-TE-036 thru AP102-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 2
DST/AWF Temperature Monitoring	AP	AP103	WST	TE		AP103-WST-TE-036 thru AP103-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 3
DST/AWF Temperature Monitoring	AP	AP104	WST	TE		AP104-WST-TE-036 thru AP104-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 4
DST/AWF Temperature Monitoring	AP	AP105	WST	TE		AP105-WST-TE-036 thru AP105-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 5
DST/AWF Temperature Monitoring	AP	AP106	WST	TE		AP106-WST-TE-036 thru AP106-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 6
DST/AWF Temperature Monitoring	AP	AP107	WST	TE		AP107-WST-TE-036 thru AP107-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 7
DST/AWF Temperature Monitoring	AP	AP108	WST	TE		AP108-WST-TE-036 thru AP108-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020603 Sheet 8
DST/AWF Temperature Monitoring	AW	AW271	WST	TI		AW271-WST-TI-001		Temperature Indicator	Convert millivolt to temperature and display		Various/Incorrect temperature displayed	H-14-020602 Sheet 1
	AW	AW271	WST	TI		AW271-WST-TI-002		Temperature Indicator	Convert millivolt to temperature and display		Various/Incorrect temperature displayed	H-14-020602 Sheet 1
DST/AWF Temperature Monitoring	AW	AW101	WST	TE	B-6.03	AW101-WST-TE-001 thru AW101-WST-TE-022		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020602 Sheet 1
DST/AWF Temperature Monitoring	AW	AW101	WST	TE		AW101-WST-TE-036 thru AW101-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020602 Sheet 1

RPP-8792, Section 4.10.1, DST/AWF Temperature Monitoring System

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
DST/AWF Temperature Monitoring	AW	AW102	WST	TE		AW102-WST-TE-036 thru AW102-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020602 Sheet 2
DST/AWF Temperature Monitoring	AW	AW103	WST	TE		AW103-WST-TE-036 thru AW103-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020602 Sheet 3
DST/AWF Temperature Monitoring	AW	AW104	WST	TE		AW104-WST-TE-036 thru AW104-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020602 Sheet 4
DST/AWF Temperature Monitoring	AW	AW105	WST	TE		AW105-WST-TE-036 thru AW105-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020602 Sheet 5
DST/AWF Temperature Monitoring	AW	AW106	WST	TE		AW106-WST-TE-036 thru AW106-WST-TE-053		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020602 Sheet 6
DST/AWF Temperature Monitoring	AY	AY801A	WST	TY		AY801A-WST-TY-100		Temperature Data Acquisition Multiplexer	Convert millivolt to temperature and display		Various/Incorrect temperature displayed	H-14-020606 Sheets 1, 2 H-14-020607 Sheets 1, 2
DST/AWF Temperature Monitoring	AY	AY101	WST	TE	B-6.04A B-6.04B	AY101-WST-TE-060 thru AY101-WST-TE-074		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020606 Sheet 1
DST/AWF Temperature Monitoring	AY	AY102	WST	TE		AY102-WST-TE-060 thru AY102-WST-TE-074		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020606 Sheet 2
DST/AWF Temperature Monitoring	AZ	AZ101	WST	TE	B-6.04A B-6.04B	AZ101-WST-TE-059 thru AZ101-WST-TE-073		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020607 Sheet 1
DST/AWF Temperature Monitoring	AZ	AZ101	WST	TE		AZ101-WST-TE-098 thru AZ101-WST-TE-104		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020607 Sheet 1
DST/AWF Temperature Monitoring	AZ	AZ102	WST	TE		AZ102-WST-TE-059 thru AZ102-WST-TE-073		Temperature Element	Generate emf related to temperature difference		Various/Incorrect emf relative to temperature gradient	H-14-020607 Sheet 2

RPP-8792, Section 4.12, Ventilation Stack Continuous Air Monitor Interlock Systems

SEL SAFETY SSC SYSTEM INFORMATION

Safety SSC	DAs	HID	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
Ventilation Stack CAM Interlock	Scaief	h0051691	HEPA Filter Failure - Exposure to High Temperature or Pressure	SS	HNF-SD-WM-SAR-067	2-D	4.4.8	The safety function of the ventilation stack CAM interlock systems is to shut down the ventilation system when high radionuclide particulate activity is detected by the CAM, limiting radioactive material releases to the atmosphere and thus decreasing the consequences of the HEPA Filter Failure—Exposure to High Temperature or Pressure (FSAR Section 3.3.2.4.2) accident.	The CAM shall measure the radiation level in the sampled flow stream and detect levels in excess of a preset level. The CAM shall activate an interlock to shut down the ventilation systems upon detection of a radiation level that exceeds a preset level. Upon CAM failure, the monitors shall actuate an alarm.	

RPP-8792, Section 4.12, Ventilation Stack Continuous Air Monitor Interlock Systems

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Ventilation Stack CAM Interlock	AN	AN296	VTP	CAM	B-2.01	AN296-VTP-CAM-510		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN296	VTP	FCV		AN296-VTP-FCV-513		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN296	VTP	P		AN296-VTP-P-514		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN271	VTP	ANN		AN271-VTP-ANN-103-09		Annunciator Window System XA-510	Indicate fail alarm status		Unknown/Loss of alarm indication	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN296	VTP	TS		AN296-VTP-TS-506		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN296	VTP	F		AN296-VTP-F-506A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN296	VTP	F		AN296-VTP-F-506B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock		AN296	VTP	TS		AN296-VTP-TS-507		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN296	VTP	HTR		AN296-VTP-HTR-507		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN296	VTP	HT		AN296-VTP-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020101 Sheet 4
Ventilation Stack CAM Interlock	AN	AN241	VTP	CON		M12		Motor Contactor for K1-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-71927 Sheet 2
Ventilation Stack CAM Interlock	AN	AN241	VTP	CON		M13		Motor Contactor for K1-5-2	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-71927 Sheet 2
Ventilation Stack CAM Interlock	AP	AP296	VTP	CAM	B-2.02	AP296-VTP-CAM-510		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	FCV		AP296-VTP-FCV-513		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	P		AP296-VTP-P-514		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP271	VTP	ANN		AP271-VTP-ANN-RADN-08		Annunciator Window System XA-510B	Indicate fail alarm status		Unknown/Loss of alarm indication	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	TS		AP296-VTP-TS-506		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	F		AP296-VTP-F-506A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	F		AP296-VTP-F-506B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	TS		AP296-VTP-TS-507		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	HTR		AP296-VTP-HTR-507		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP296	VTP	HT		AP296-VTP-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020103 Sheet 3
Ventilation Stack CAM Interlock	AP	AP241	VTP	CON		M13		Motor Contactor for K1-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90476 Sheet 2
Ventilation Stack CAM Interlock	AP	AP241	VTP	CON		M14		Motor Contactor for K1-5-2	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90476 Sheet 2
Ventilation Stack CAM Interlock	AW	AW296	VTP	CAM	B-2.03	AW296-VTP-CAM-510		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	FCV		AW296-VTP-FCV-513		Flow Regulator	Regulate to maintain minimum flow as filter loads		Unknown/possible loss of minimum flow resulting in undersampling of airstream	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	P		AW296-VTP-P-514		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	ANN		AW271-VTP-ANN-102-08		Annunciator Window System XA-510B	Indicate fail alarm status		Unknown/Loss of alarm indication	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	TS		AW296-VTP-TS-506		Fan Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020102 Sheet 3

RPP-8792, Section 4.12, Ventilation Stack Continuous Air Monitor Interlock Systems

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
Ventilation Stack CAM Interlock	AW	AW296	VTP	F		AW296-VTP-F-506A		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	F		AW296-VTP-F-506B		Fan	Control Cabinet Environment		Motor failure/temperature out of limits	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	TS		AW296-VTP-TS-507		Heater Temperature Switch	Control Cabinet Environment		Fail to acutate/temperature out of limits	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	HTR		AW296-VTP-HTR-507		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	TS		AW296-VTP-TS-505		Heat Trace Temperature Switch	Control heat trace, prevent condensation in sample line		Fail to acutate/temperature out of limits	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW296	VTP	HT		AW296-VTP-HT-TBD		Sample Line Heat Trace	Prevent condensation in sample line		Open circuit/temperature out of limits	H-14-020102 Sheet 3
Ventilation Stack CAM Interlock	AW	AW241	VTP	CON		M12		Motor Contactor for K1-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90928 Sheet 1
Ventilation Stack CAM Interlock	AW	AW241	VTP	CON		M13		Motor Contactor for K1-5-2	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90928 Sheet 1
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	CAM	B-2.04 B 2.04A	AZ702-VTP-RIAS-AZK1-1		Continuous Air Monitor	Monitor sample particulate and alarm when radiation level exceeds the setpoint		Various/Incorrect radiation measurement and failure to alarm at the setpoint	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	FIT		AZ702-VTP-FIT-AZK1-3		Stack Flow Transmitter	Measure and transmit stack flow value to flow controller		Various/incorrect stack flow resulting in incorrect or loss of flow control to CAM	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	TT		AZ702-VTP-TT-AZK1-3		Stack Temperature Transmitter	Transmit stack temperature to mass flow transmitter		Various/incorrect stack flow resulting in incorrect or loss of flow control to CAM	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	FIT		AZ702-VTP-FIT-AZK1-1		CAM Flow Transmitter	Measure and transmit CAM flow value to flow controller		Various/incorrect flow transmitted resulting in incorrect or loss of flow control to CAM	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	TT		AZ702-VTP-TT-AZK1-1		CAM Temperature Transmitter	Transmit stack temperature to mass flow transmitter		Various/incorrect flow resulting in incorrect or loss of flow control to CAM	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP			AZ702-VTP-UC-AZK1-2		Flow Controller	Control CAM sample flow		Various/incorrect CAM flow	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP			AZ702-VTP-MV-AZK1-1		Flow Control Valve	Control CAM sample flow		Various/incorrect CAM flow	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP			AZ702-VTP-UC-AZK1-1		Vacuum/Pump Controller	Maintain vacuum and control pumps		Various/incorrect or loss of CAM flow	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP			AZ702-VTP-MV-AZK1-3		Vacuum Control Valve	Maintain vacuum		Various/loss of vacuum	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	P		AZ702-VTP-AZ-K1-11-1		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	P		AZ702-VTP-AZ-K1-11-2		Vacuum Pump	Maintain sample flow by providing a vacuum		Various (motor/bearings/carbon vanes)/loss of sufficient vacuum to achieve minimum flow resulting in undersampling of airstream	H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	XA		AZ702-VTP-XA-AZK1-1		CAM Fail Indicator				H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	RA		AZ702-VTP-RA-AZK1-1B		CAM Fail Horn				H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AZ	AZ271	VTP	RAX		RAX-AZK1-1		CAM Fail Alarm				H-14-020107 Sheet 6
Ventilation Stack CAM Interlock	AY	AY241	VTP	CON		M1		Motor Contactor for RECIRC FAN AY101-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 1
Ventilation Stack CAM Interlock	AY	AY241	VTP	CON		M1		Motor Contactor for RECIRC FAN AY102-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 1
Ventilation Stack CAM Interlock	AZ	AZ241	VTP	CON		M1		Motor Contactor for RECIRC FAN AZ101-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 2
Ventilation Stack CAM Interlock	AZ	AZ241	VTP	CON		M1		Motor Contactor for RECIRC FAN AZ102-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 2
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	VSD		AZ702-VTP-VSD-1		Varible Speed Drive for Fan AZ-K1-5-1A	Remove power from fan motor when de-energized		Various/failure to shut down fan	H-2-131367 Sheet 5 H-14-020107 Sheet 4
Ventilation Stack CAM Interlock	AZ	AZ702	VTP	VSD		AZ702-VTP-VSD-2		Varible Speed Drive for Fan AZ-K1-5-1B	Remove power from fan motor when de-energized		Various/failure to shut down fan	H-2-131367 Sheet 7 H-14-020107 Sheet 5

RPP-8792, Section 4.14, High-Efficiency Particuklate Air Filter Differential Pressure Interlock Systems

SEL SAFETY SSC SYSTEM INFORMATION

Safety SSC	DAs	HID	Accident	Safety Class	Reference Document	Reference Document Revision	Reference Document Section	SSC Safety Function	SSC Functional Requirement	Notes
HEPA Filter DP Interlock	Scaief / Gustavson	h0051691/ h0039521	High-Efficiency Particulate Air Filter Failure—Exposure to High Temperature or Pressure.	SS	HNF-SD-WM-SAR-067	2-D	4.4.10	The safety functions of the HEPA filter differential pressure interlock systems are (1) to shut down the ventilation system when high differential pressure is detected by the differential pressure system, thereby preventing the release of radiological and toxicological material due to HEPA filter loading and subsequent failure, thus reducing the likelihood of HEPA filter failure events due to the HEPA Filter Failure-Exposure to High Temperature or Pressure (FSAR Section 3.3.2.4.2) accident and (2) to shut down the ventilation system when low differential pressure is detected by the differential pressure system, thereby limiting the radiological and toxicological material released to the atmosphere and thus decreasing the consequences of the HEPA Filter Failure-Exposure to High Temperature or Pressure (FSAR Section 3.3.2.4.2) accident.	The HEPA filter differential pressure interlock system, when installed, shall operate continuously while the ventilation systems are operating, monitoring the differential pressure conditions as required to perform its safety function. The differential pressure transmitters will (1) monitor the differential pressure across the last HEPA filter stage and detect differential pressure lower than a preset value and (2) monitor the differential pressure across the first HEPA filter stage and detect differential pressure higher than a preset value. The PLC will activate an interlock to shut down the ventilation system upon detection of a differential pressure that is either higher or lower than the preset levels. Upon detectable transmitter or PLC failure, the system will actuate the interlock to shut down the ventilation system. The HEPA filter differential pressure interlock system, along with the HEPA filters, will provide the same level of control availability as the ventilation stack CAM interlock system.	

RPP-8792, Section 4.14, High-Efficiency Particuklate Air Filter Differential Pressure Interlock Systems

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
HEPA Filter DP Interlock	AN	AN241	VTP	YYC		AN241-VTP-YYC-300		Programmable Logic Controller	Read DP and interlock fan when out of limits		Various/failure to shut down fan on out of specification DP	H-14-020101 Sheet 3
HEPA Filter DP Interlock	AN	AN241	VTP	PDIT		AN241-VTP-PDIT-327		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020101 Sheet 3
HEPA Filter DP Interlock	AN	AN241	VTP	PDIT		AN241-VTP-PDIT-328		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020101 Sheet 3
HEPA Filter DP Interlock	AN	AN241	VTP	PDIT		AN241-VTP-PDIT-427		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020101 Sheet 3
HEPA Filter DP Interlock	AN	AN241	VTP	PDIT		AN241-VTP-PDIT-428		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020101 Sheet 3
HEPA Filter DP Interlock	AN	AN241	VTP	CON		M12		Motor Contactor for K1-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-71927 Sheet 2
HEPA Filter DP Interlock	AN	AN241	VTP	CON		M13		Motor Contactor for K1-5-2	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-71927 Sheet 2
HEPA Filter DP Interlock	AN	AN241	VTP	K		AN241-VTP-K-601		Watchdog Timer Relay	Remove power from fan motor when PLC does not reset		Various/failure to shut down fan on PLC failure	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AN	AN241	VTP	HTR		AN241-VTP-HTR-120A		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AN	AN241	VTP	HTR		AN241-VTP-HTR-120B		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AP	AP241	VTP	YYC		AP241-VTP-YYC-300		Programmable Logic Controller	Read DP and interlock fan when out of limits		Various/failure to shut down fan on out of specification DP	H-14-020103 Sheet 2
HEPA Filter DP Interlock	AP	AP241	VTP	PDIT		AP241-VTP-PDIT-327		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020103 Sheet 2
HEPA Filter DP Interlock	AP	AP241	VTP	PDIT		AP241-VTP-PDIT-328		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020103 Sheet 2
HEPA Filter DP Interlock	AP	AP241	VTP	PDIT		AP241-VTP-PDIT-427		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020103 Sheet 2
HEPA Filter DP Interlock	AP	AP241	VTP	PDIT		AP241-VTP-PDIT-428		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020103 Sheet 2
HEPA Filter DP Interlock	AP	AP241	VTP	CON		M13		Motor Contactor for K1-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90476 Sheet 2
HEPA Filter DP Interlock	AP	AP241	VTP	CON		M14		Motor Contactor for K1-5-2	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90476 Sheet 2
HEPA Filter DP Interlock	AP	AP241	VTP	K		AP241-VTP-K-601		Watchdog Timer Relay	Remove power from fan motor when PLC does not reset		Various/failure to shut down fan on PLC failure	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AP	AP241	VTP	HTR		AP241-VTP-HTR-120A		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AP	AP241	VTP	HTR		AP241-VTP-HTR-120B		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AW	AW241	VTP	YYC		AW241-VTP-YYC-300		Programmable Logic Controller	Read DP and interlock fan when out of limits		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AW	AW241	VTP	PDIT		AW241-VTP-PDIT-327		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AW	AW241	VTP	PDIT		AW241-VTP-PDIT-328		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AW	AW241	VTP	PDIT		AW241-VTP-PDIT-427		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AW	AW241	VTP	PDIT		AW241-VTP-PDIT-428		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AW	AW241	VTP	CON		M12		Motor Contactor for K1-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90928 Sheet 1
HEPA Filter DP Interlock	AW	AW241	VTP	CON		M13		Motor Contactor for K1-5-2	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-90928 Sheet 1
HEPA Filter DP Interlock	AW	AW241	VTP	K		AW241-VTP-K-601		Watchdog Timer Relay	Remove power from fan motor when PLC does not reset		Various/failure to shut down fan on PLC failure	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AW	AW241	VTP	HTR		AW241-VTP-HTR-120A		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AW	AW241	VTP	HTR		AW241-VTP-HTR-120B		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AZ	AZ702	VTP	YYC		YYC-AZK1-300		Programmable Logic Controller	Read DP and interlock fan when out of limits		Various/failure to shut down fan on out of specification DP	H-14-020107 Sheets 4,5
HEPA Filter DP Interlock	AZ	AZ702	VTP	PDIT		PDT-AZK104-1A		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AZ	AZ702	VTP	PDIT		PDT-AZK104-2A		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AZ	AZ702	VTP	PDIT		PDT-AZK104-1B		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AZ	AZ702	VTP	PDIT		PDT-AZK104-2B		Pressure Transmitter	Measure DP and transmit to PLC		Various/failure to shut down fan on out of specification DP	H-14-020102 Sheet 2
HEPA Filter DP Interlock	AZ	AZ702	VTP	K		K-AZK1-601		Watchdog Timer Relay	Remove power from fan motor when PLC does not reset		Various/failure to shut down fan on PLC failure	H-14-104165 Sheet 7

RPP-8792, Section 4.14, High-Efficiency Particuklate Air Filter Differential Pressure Interlock Systems

SEL SAFETY SSC COMPONENT INFORMATION

Safety SSC	Farm	Location	System	Comp Type	SEL-040 REV.4B APP. REF.	EIN	Sub-Component Identifier	Component or Sub-Component Name	Item Contribution to Overall Safety Function	Performance Criteria	Failure Mode & Effect	Notes
HEPA Filter DP Interlock	AZ	AZ702	VTP	K		K-AZK1-605		Fan Status Relay	Provide fan "on" status to PLC		Fail to energize (close)/PLC does not sense fan "on" and fails to shut down fan on out of limit DP	H-2-131367 Sheet 2
HEPA Filter DP Interlock	AZ	AZ702	VTP	K		K-AZK1-606		Fan Status Relay	Provide fan "on" status to PLC		Fail to energize (close)/PLC does not sense fan "on" and fails to shut down fan on out of limit DP	H-2-131367 Sheet 2
HEPA Filter DP Interlock	AZ	AZ702	VTP	HTR		AW241-VTP-HTR-120A		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AZ	AZ702	VTP	HTR		AW241-VTP-HTR-120B		Cabinet Heater	Control Cabinet Environment		Open circuit/temperature out of limits	H-14-104165 Sheet 7
HEPA Filter DP Interlock	AY	AY241	VTP	CON		M1		Motor Contactor for RECIRC FAN AY101-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 1
HEPA Filter DP Interlock	AY	AY241	VTP	CON		M1		Motor Contactor for RECIRC FAN AY102-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 1
HEPA Filter DP Interlock	AZ	AZ241	VTP	CON		M1		Motor Contactor for RECIRC FAN AZ101-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 2
HEPA Filter DP Interlock	AZ	AZ241	VTP	CON		M1		Motor Contactor for RECIRC FAN AZ102-K4-5-1	Remove power from fan motor when de-energized		Contact welding/failure to shut down fan	H-2-131366 Sheet 2
HEPA Filter DP Interlock	AZ	AZ702	VTP	VSD		AZ702-VTP-VSD-1		Varible Speed Drive for Fan AZ-K1-5-1A	Remove power from fan motor when de-energized		Various/failure to shut down fan	H-2-131367 Sheet 5 H-14-020107 Sheet 4
HEPA Filter DP Interlock	AZ	AZ702	VTP	VSD		AZ702-VTP-VSD-2		Varible Speed Drive for Fan AZ-K1-5-1B	Remove power from fan motor when de-energized		Various/failure to shut down fan	H-2-131367 Sheet 7 H-14-020107 Sheet 5